UNIVERSITY OF TAMPERE

Faculty of Management

VIETNAM FISHERIES TOWARDS A MORE SUSTAINABLE AND RESPONSIBLE DEVELOPMENT

Supervisor: Kirsi Hasanen

Student: Le Thi Ngoc Thuy

September 2018

ACKNOWLEDGEMENT

The Master Programme of Public Policy and Financial Management organized by the National Academy of Public Administration (NAPA) and the University of Tampere (UTA) has enriched my knowledge in fields of public policy and public finance. Therefore, I would like to express my deepest thanks to NAPA and UTA for organizing a very professional and meaningful program.

I am deeply grateful to my supervisor - Ms. **Kirsi Hasanen**, a Post-doctoral researcher at Faculty of Management, University of Tampere (UTA). Her enthusiastic encouragements during my thesis progress have helped me to complete the thesis in the short period of time. I would like to express my deepest gratitude to Truong Thuy Van, the member of Educational Export Team at Faculty of Management, University of Tampere (UTA) for the trust and positive support throughout the Master Programme.

I would like to express my thanks to all the interviewees who provided extremely valuable resources for my thesis. I may not mention their names, but I want to express my truly appreciation to all of them. In addition, I would like to send my warmest thanks to the Central Organization Committee, 165 Project Office who have provided me with a good condition for the study.

Finally, I am very thankful to my family, friends and colleague for their support encouragement during my writing.

Hanoi, 2018

Le Thi Ngoc Thuy

ABSTRACT

University of Tampere	Faculty of Management,
Author	LE THI NGOC THUY
Title of Thesis	*Vietnam fisheries towards a more sustainable and responsible development*
Master's Thesis	81
Time	2018
Keywords	fisheries, sustainable development, Vietnam

It is true that most countries in the world are very interested in sustainable development in the socio-economic fields. "Sustainable development" is even seen as a strategy and goal of many countries. As Vietnam is a coastal country with many advantages to develop its fisheries activities, the Party and the State attach great importance to the development of the fisheries sector. The fisheries sector has become one of the key economic sectors, ranking the fourth in export turnover in Vietnam. In the 60 years of establishment and development, the fisheries sector has achieved many remarkable achievements. However, the development of the fisheries sector should be evaluated for sustainability. Therefore, I decided to do this study. I hope to find out effective solutions that assist Vietnam fisheries towards a more sustainable and responsible development. This study applied both of the quantitative and qualitative methods. The primary data were collected through 25 interviews with open-ended questions and the survey results of the previous studies. The secondary material consists of documents and statistical data from official sources of Vietnam such as the General Statistics Office (GSO), the Ministry of Agriculture and Rural Development (MARD), the Research Institute of Marine Fisheries (RIMF). The findings of the research reassured the important role of sustainable development of Vietnam fisheries in international economic integration. Furthermore, the findings of the research indicated that the fisheries sector should propagandize and raise awareness of managers and fishermen in the implementation of Fisheries Law 2017, especially the co-management in the protection of fisheries resources, the exploitation according to quotas, combating IUU-fishing (Illegal, Unreported and Unregulated fishing), and overcoming the yellow card of the European Union. The research contributed to practice of sustainable development in Vietnam fisheries and suggested solutions to assist Vietnam fisheries towards a sustainable development.

Table of Contents

LIST OF TABLES

LIST OF CHARTS

LIST OF ABBREVIATIONS

Name of Organizations

Agrotrade Vietnam	Agro Processing and Market Development Authority
DARD	Department of Agriculture and Rural Development
D-Fish	Directorate of Fisheries (was established in 2010)
EC	European Commission
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FICen	Fisheries Information Center
GDVC	General Department of Vietnam Customs
GSO	General Statistics Office
IUCN	International Union for Conservation of Nature
MARD	Ministry of Agriculture and Rural Development
MCD	Centre for Marine Life Conservation and Community Development
MOF	Ministry of Finance
MOFI	Ministry of Fisheries (was merged into the Ministry of Agriculture and Rural Development in 2007)
MOJ	Ministry of Justice
MONRE	Ministry of Natural Resources and Environment of the socialist republic of Vietnam
MPI	Ministry of Planning and Investment
NAFIQAD	National Agro-Forestry-Fisheries Quality Assurance Department
OECD	Organization for Economic Co-operation and Development
RIA1	Research Institute for Aquaculture No. 1
RIA2	Research Institute for Aquaculture No. 2
RIA3	Research Institute for Aquaculture No. 3
RIMF	Research Institute for Marine Fisheries

SGP UNDP/GEF	Small Grants Programme of Global Environment Fund of UNDP
SUMA	Project "Support marine and brackish water aquaculture"
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
VASEP	Vietnam Association of Seafood Exporters and Producers
VIFEP	Vietnam Institute of Fisheries Economics and Planning
WB	World Bank
WCED	World Commission on Environment and Development

Measure units

CV	Cheval-vapeur (measuring of capacity of fishing vessels)
ha	hectare (measuring of aquaculture area)
m	meter
pcs	pieces (measuring of number of fishing vessels)
VND	Viet Nam Dong (1 USD ~ 22,715 VND)

Concepts

ASI	Aquaculture Sustainability Index
CCRF	The Code of Conduct for Responsible Fisheries adopted by Vietnam and the member countries of FAO in 1995, defining the principles of sustainable fisheries management
CSA	Community Sustainability Assessment
ESI	Environmental Sustainability Index
GAP	Good Agricultural Practices
GDP	Gross domestic product
IUU fishing	Illegal, Unreported and Unregulated fishing
MPA	Marine protection areas
SD	Sustainable development
VietGAP	Vietnamese Good Agricultural Practices

CHAPTER 1. INTRODUCTION

Over the last three decades, most countries in the world have been very interested in sustainable development. "Sustainable development" is even seen as a strategy and goal of many countries. As Vietnam is a coastal country with many advantages to develop its fisheries activities, the Party and the State attach great importance to the development of the fisheries sector. As a result, the fisheries sector has become one of the key economic sectors, ranking the fourth in terms of export turnover in Vietnam. In the 60 years of establishment and development, the fisheries sector has achieved many remarkable achievements. However, the development of the fisheries sector should be evaluated for sustainability.

1.1 Background of Vietnam fisheries and sustainable development issue

1.1.1 An economic sector with many advantages in Vietnam

Vietnam is a coastal country with a coastline of 3260 km, about 3000 islands, an exclusive economic zone of over 1 million km2 (three times larger than land area), occupying nearly 30% of the East Sea area; There are many lagoons, bays, islands, clusters of islands alternating naturally. Vietnamese aquatic resources are very diverse. According to a survey conducted by the Research Institute for Marine Fisheries in 2011-2015 (reported in April of 2018), marine species of total 1081 including 881 species of fish, 115 species of crustaceans (shrimps, lobsters, crabs), 41 species of cephalopods (squid, cuttlefish, octopus), 44 species of mollusks and other groups have been found in Vietnam's sea areas.

With about 2360 rivers and 1055 lakes of 5 hectares or more, the aquatic resources of the inland areas of Vietnam are over 700 species; In particular, there are many indigenous, precious and rare, species of high economic and scientific value. The potential of aquatic resources of the inland areas of Vietnam is rich and diverse, especially fish species: freshwater fish, brackish water fish, fish migrating from the sea into the river and vice versa.

Fisheries sector is one of important sectors of Vietnam, contributing to economic growth, household nutrition, rural employment and foreign exchange earnings. Vietnam Fisheries sector has three sub-sectors: Aquaculture (farmed fish), inland capture fisheries (fish caught in rivers and lakes), and marine capture fisheries (fish caught in the ocean). The fisheries sector is commonly grouped with the agriculture and forestry sectors. GDP in all three sectors has fluctuated between 15.3% and 19.6% in 2010-2017.

1.1.2 Promoting the advantages and towards a sustainable development

In 1991, the Prime Minister of Vietnamese government issued Directive 187/CT-TTg dated 12th of June, for the National Plan for Environment and Sustainable Development in 1991-2000. Then, the issue of sustainable development was reaffirmed in the documents of the Ninth National Congress of the Communist Party of Vietnam and in the 2001-2010 socio-economic development strategy, sustainable development has become the line, the view of the Party and State policies. Accordingly, *the strategic direction of Vietnam's fisheries development in the period 2001-2010 is* "To bring into full play the advantages of fisheries, forming a spearhead economic branch and rise to the top in the region. Freshwater, brackish and saltwater aquaculture, especially in improved, efficient and environmentally sustainable manner is strongly developed; To build capacity, enhance the efficiency of offshore fishing and restructuring, change occupational structure, stabilize near-shore fishing; To increase the capacity of preserving and processing products to meet the international and domestic market requirements, ensuring the restoration and development of aquatic resources".

National Agenda 21 in fisheries sector

In 2004, understanding the important role of sustainable development (SD) for growing national economy, the Prime Minister Enacted Decision 153/2004/QD-TTg dated 17th of August, about "Strategic directions of SD in Viet Nam" or also called "National Agenda 21 of Viet Nam". After that, Ministry of Planning and Investment (MPI) selected 04 sectors and 06 provinces to undertake pilot sites relating to the implementation of Agenda 21, included the fisheries sector.

National Agenda 21 in fisheries sector presented the status of implementing SD in fisheries sector, the challenges and opportunities in the process of implementation of SD, the direction and objectives in the future, the solutions and recommendations. The issues were implemented as following:

Table 1: National Agenda 21 in Vietnam fisheries sector, 8/2004

The Steering committee of fisheries sector SD was established by Ministry of Fisheries under leadership of one Vice - minister
The initial assessment of the status of fisheries development in three sectors - Aquaculture, marine capture and fisheries resources protection; and the proposed SD indicators for the three sectors
Implementing demonstration sites for fisheries SD plans in Cat Ba island (in Hai Phong city)
The propaganda of SD programs on the mass media

Proposed "SD Strategy for Fisheries sector"
Initially putting issues related to SD into fisheries development plans/projects
Deploying scientific research projects on sustainable development, co-management, integrated management, setting up Aquaculture Sustainability Index (ASI)
The international/regional cooperation to implement international commitments (FAO) on responsible and sustainable fisheries development

In 2010, the Prime Minister of Vietnamese government issued Decision 1690/QD-TTg dated 16th of September, for *Strategy for Development of Vietnam fisheries up to 2020*. Accordingly, Vietnam develops Fisheries sector into a commodity production industry - having a prestigious and highly competitive trademark in international economic integration based on the advantages of Fisheries sector; Reorganizing production in all sectors (exploitation, aquaculture, processing) in the value chain to increase the value of Vietnamese seafood; Raising the standard of living and living conditions of fishing communities; Training and fostering human resources; Developing fisheries towards quality and sustainability on the basis of solving the relationship between enhancing added value, quality assurance, food hygiene and safety, environmental protection, conservation, aquatic resource development, and social security; Enhancing the capacity of state management based on a scientific approach to integrated fisheries management with community participation and a reciprocal relationship with other economic sectors to develop sustainable fisheries. Targeting to 2020, the fisheries sector is industrialized - modernized and develop in a sustainable manner, into a large commodity production sector with structure and organizational forms, which are reasonable, productive, quality, effective, prestigious, highly competitive and firmly integrated into the world economy. At the same time, gradually raising the people's intellectual level, material and spiritual life of fishermen, attach with the protection of the ecological environment.

In 2007, the Party Central Committee issued Resolution 09-NQ/TW dated 9th of February, on Vietnam's Marine Strategy to 2020. *In 2013*, the Prime Minister of Vietnamese government issued Decision 1445/QD-TTg dated 16th of August, approving the Master plan for fisheries development up to 2020, vision 2030. *Three months later*, MARD issued Decision 2760/QD-BNN-TCTS dated 22nd of November, approving the Restructuring of fisheries sector towards enhancing added value and sustainable development. *In 2018*, the Party Central Committee issued Resolution 36-NQ/TW dated 22nd of October, on Strategic Sustainable Development of Vietnam's Marine Economy to 2030 with a vision to 2045.

As such, it can be seen that Vietnam fisheries sector is very concerned, attaching importance to development. Nevertheless, is that sustainable development?

> Sustainable development is simply "Development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs" (WCED, 1987).

In order to monitor and evaluate the development of the fisheries sector, Vietnam needs to use effective tools as a theoretical and scientific basis for determining the level of sustainable development of fisheries sector. That is sets of indicators will be discussed in the next sections of the thesis.

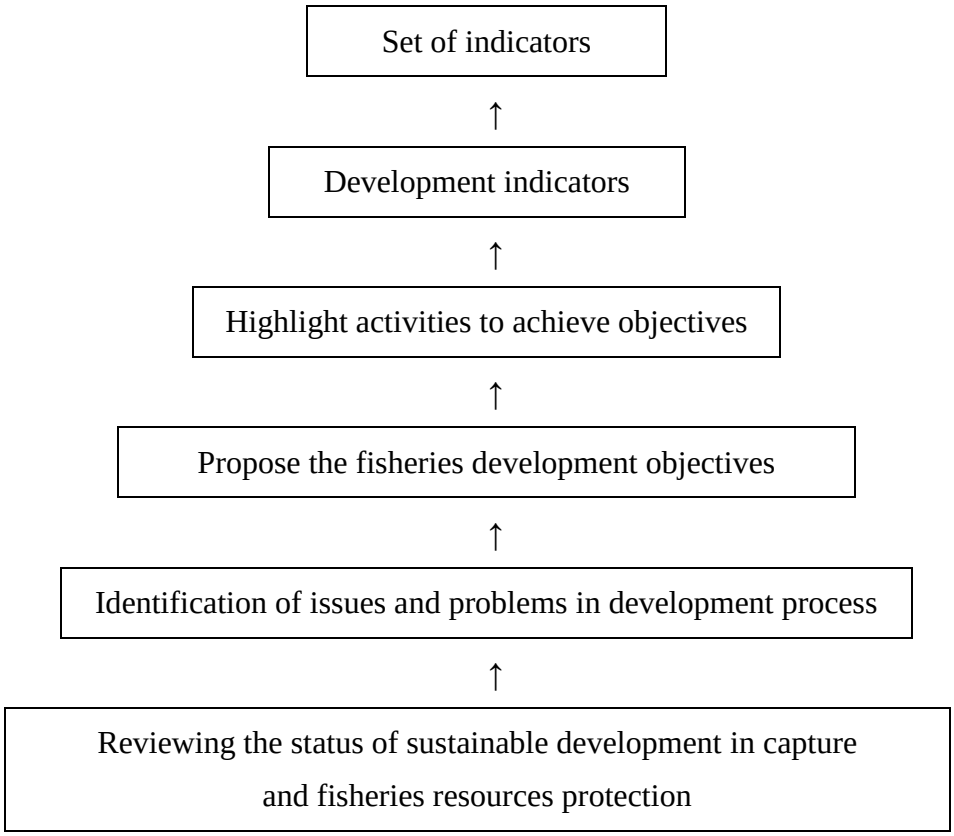
1.1.3 A brief overview on sustainable development indicators of Vietnam Fisheries

In 2006, Vietnam Institute of Fisheries Economics and Planning (VIFEP) developed a set of indicators for sustainable development in capture sector to protect fisheries resources. This was one of two sets of indicators for sustainable fisheries development in that year.

For the successful development of this indicator set, VIFEP consulted on a number of international documents, including the Food and Agriculture Organization of the United Nations (FAO) and the International Union for Conservation of Nature (IUCN). Accordingly, the set of indicators was developed based on the logical framework: After considering the development status of the fisheries sector and identifying emerging issues in the development process, the research was conducted to propose the target and solutions for achieving that goal. The indicator set was used to monitor and evaluate the sustainable development of the fisheries sector.

According to VIFEP, this indicator set could be used at national and provincial levels. In the study, VIFEP decided to select only the indicators that best fit the context of the Vietnamese fishery. The indicator set was developed based on the economic, social, environmental (ecological) and institutional dimensions. The purpose of the proposed set of indicators was to help policy makers and state management agencies monitor the sustainable development of fisheries resources exploitation and protection. The set of indicators was set up in the following 06 basic steps:

Table 2: The six basic steps of developing the set of sustainable development indicators of capture and fisheries resources protection



In the same year (2006), VIFEP developed a set of indicators for sustainable development in aquaculture sector to help Vietnam assess and determine the level of sustainable aquaculture development. Two sets of indicators developed by VIFEP relating to capture fisheries and aquaculture will be discussed in detail in the next sections of Chapter 2 - Literature Review.

In 2012, D-Fish developed a set of indicators to monitor and assess the implementation of the development strategy of Vietnam fisheries up to 2020. This set of indicators covers almost all fisheries activities and it will be presented clearly in Chapter 2.

1.2 The aim of the research

This research aims to help Vietnam fisheries towards a more sustainable and responsible development. For that reason, it is necessary to assess and determine the status of Vietnamese fisheries. In case of unsustainable development of Vietnamese fishery, further research, search and discovery of causes should be carried out. Then, recommendations are proposed to promote Vietnamese fisheries towards sustainable development.

For determining, whether Vietnamese fisheries are sustainable developing, criteria for evaluation are required. Therefore, I will study the concepts of sustainable development in general and sustainable development in the fisheries sector in particular. Next, I will study how to measure sustainable development levels.

Internationally, a series of indicators has been developed to measure the level of sustainable development in the fisheries sector. For example, "*Indicators for Sustainable Development of Marine Capture Fisheries*" (FAO, 1999); "*The FAO guidelines for the development and use of indicators for sustainable development of marine capture fisheries and an Australian example of their application*" (FAO, 2000); "*Fisheries Sustainability Indicators: The OECD experience*" (OECD, 2002); "*A Comparative Analysis of Sustainable Fishery Development Indicator Systems in Australia and Canada*" (Wen Hong Liu and Ching Hsiewn Ou, 2007).

After applying the above Indicators on Fisheries in Vietnam, a comprehensive picture of development will be presented, as well as a basis for assessing and determining the level of sustainable development in the fisheries sector of the country. In case of unsustainable development, the aim is to find out causes and seek solutions to help Vietnam fisheries towards a sustainable development.

In general, the specific objectives of the study are that to review the literature related to sustainable fisheries development; to describe the context and nature of sustainable fisheries development in Vietnam and the D-Fish viewpoints, the government regulations and especially Fisheries Law 2017. Then it will map the status of fisheries development in Vietnam, activities to promote sustainable development, the achievements and limitations of such development. The analysis of the current situation will be creating a basis for developing solutions to the existing challenges. Thus, the study will suggest some recommendations for promoting Vietnam fisheries towards a more sustainable and responsible development.

However, this study will mainly focus on important fields of Vietnam fisheries including capture fisheries, aquaculture, processing and trading. The data will be collected from secondary material such as books, magazines, reports, statistics, and internet; especially, select and inherit the survey results of previous studies. Moreover, primary data will be gathered through interview, seminars, workshops, conferences, meetings, and forums. Accordingly, the specific research questions are the following:

1) What is the status of the fisheries sector in Vietnam?

2) How can Vietnam promote the sustainable development of the fisheries sector?

By answering these questions, the research will provide new insights to the sustainable fisheries development in Vietnam, and in this way, it supports systematization of the practice of sustainable development in the fisheries activities according to D-Fish guidelines and policies, particularly Fisheries Law 2017. This helps to improve the effectiveness of fisheries development activities. The research results will forma necessary referential source for Vietnam Fisheries' application of sustainable development in order to assist Vietnam Fisheries towards a more sustainable and responsible development.

1.3 The structure of the research

The research has five chapters. The first chapter introduces the background, target and structure of the thesis. It also introduces briefly about building indicators for sustainable fisheries development in the world and in Vietnam. The second chapter presents a literature review on concepts of sustainable fisheries development. In addition, measure methods of sustainable fisheries development are introduced. Especially, concepts and measure methods of sustainable development of catching and aquaculture sectors will be presented. The third chapter will demonstrate the research methodology including the research methods, data collecting methods and data analysis. The fourth chapter will present the findings of the research including the current situation of Vietnam fisheries and the implementation towards sustainable development, particularly since Vietnam Fisheries Law 2017 was signed, replacing Fisheries Law 2003. The chapter five will evaluate the strengths and weaknesses of Vietnam fisheries sector, and definitely this last chapter will provide conclusions and recommendations to promote Vietnam fisheries towards a more sustainable and responsible development.

CHAPTER 2. LITERATURE REVIEW

For the literary review, I reviewed international and Vietnamese documents referring the concepts of "sustainable development", "sustainable fisheries development", "sustainable development in marine capture fisheries", "sustainable development in aquaculture". Next, I looked at the national and international literature showing the methods for determining the levels of sustainable development, and the methods for measuring through the sets of indicators developed by the international organizations and state management agencies of Vietnam. Interestingly, in this study, the levels of sustainable fisheries development were determined by the qualitative method through analysis and synthesis; as well as being measured by the quantitative method through sets of indicators. In order to have a good understand of sustainable fisheries development, I reviewed the relevant literature. A great deal of documents was used to explore the context of the study. The information resources were very easy to get because it was available on the website of the Government and agencies/organizations in the world.

2.1 The concept of sustainable development

Today sustainable development is seen as the strategy and goal of the entire human race. “Sustainable development is a development that meets the needs of the present, but does not hinder the fulfillment of the needs of future generations” (WCED, 1987). This definition has been adopted by nearly 180 countries at the United Nations Summit Conference on Environment and Sustainable Development in Brazil on June 3-14, 1992.

The book “*Sustainable World*” (1995) also points out that in order to achieve sustainable development, the following requirements must be met: (1) Economically, do not impoverish a group while enriching other groups; (2) In terms of ecological environment, do not degrade biodiversity and productivity in the ecosystem and vital components of life; (3) - (4) In terms of policy - society, there must be solidarity, coordination of action, joint participation of sectors, individuals and international organizations.

In the 1990s, people tended to identify a sustainable society by measuring sustainable development. As a result, a series of sustainable development indicators was created for the measurement. In 1995, the United Nations Environmental Assessment Program reviewed the sustainable development indicators of the UN Development Program, the UN Department of Policy on Co-ordination and Sustainable Development, the Scientific Committee on Problems of the Environment, the World Resources Institute and the World Bank (Gordon Mitchell, 1996).

According to Gordon Mitchell, there is no common measurement method of sustainable development of all areas, and no common measurement method used by all countries, governments, public local authorities, and non-governmental organizations.

The concept of "sustainable development" expresses concern about environmental issues in relation to socio-economic issues (Hopwood et al., 2005). To promote sustainability, it is necessary to measure the level of sustainable development. Sustainable development indicator (SDI) sets are built on a national scale, so it is difficult to apply locally. Consequently, there are many sets of sustainable development indicators (SDIs), each consisting of a series of specific indicators.

In the field of fisheries, according to the OECD (2000), more responsible and sustainable management of fisheries will bring more socio-economic benefits. But the transition to more responsible and sustainable fisheries is a difficult process related to the environmental, economic and social implications. In OECD countries, several fish stocks are over-exploited and the transition to responsible and sustainable fisheries is required. Nevertheless, this transition is very complex because of a rearrangement of policies that affect fishermen and other stakeholders. So the fisheries policies and strategies should limit the negative impact of the transition, in the opposite, enhancing benefits in the future. The main issue in fisheries management is how to conserve aquatic resources to environmentally, economically and socially sustainable levels. Some countries improve fisheries management through strengthening fishermen's awareness, while other countries implement co-management through sharing management rights for fishermen. Regardless of how it is managed, all aspects of fisheries should be considered in order to have a successful transition to responsible fisheries.

To make the security of the sustainability of fish stocks, require that must have the management programs - the decentralization or co-management - in order to protect aquatic resources. The countries have marine capture activities need to apply the catching rules and sanction for violation cases (World Fish Center, 2008). According to the OECD, coastal countries need to have the legal framework and sustainable development policies. Towards responsible fisheries, governments need to have aquatic resource management programs; to implement propaganda and education to raise awareness of the people.

Relating to sustainable development of Vietnam fisheries sector, two extremely important document written in English by MOFI & WB respectively in 2005 and 2006 (named "*Vietnam Fisheries and Aquaculture Sector Study*" and "*Guidelines for Environmental Management of Aquaculture*

Investments in Vietnam") showed that Vietnam fisheries sector has been marked by rapid changes in institutional structure and policies from a centrally planned economy to one with a more market-driven orientation since the implementation of Doi Moi policy 1986 (called "Renewed Policy" in English language). Although the changes are far from complete, and there remain questions about the sustainability, Vietnam identified the need to form new policies that can support sustainable resource management and use with the main objective of reducing poverty in an environmentally sustainable and socially acceptable manner.

In 2004, Ministry of Fisheries (MOFI) emphasized the importance of sustainable development through effective management of aquatic resources, proper planning, development of support infrastructure, and decision making to assure stable productivity and sustainability of the sector. "Fisheries Law 2003" was approved by the National Assembly and became effective in July 2004 contains 62 articles. Of which, Article 5 is about "Sustainable fisheries development"; Article 11 is about "Principles in fishing operations including issues of sustainability, seasons, species and size limitations". Fisheries Law 2003 does not specify the regulatory settings but rather refers to the Ministry of Fisheries as having the responsibility of implementing guidelines, regulations and standards for sustainable production.

2.1.1 Sustainable development in capture fisheries

According to research result of FAO in 1999 (*Indicators for Sustainable development of Marine capture fisheries*), fishery is an important industry in the world, supplying more than 100 million tons of fish and providing livelihoods for 200 million people annually. More than a billion people, especially those from poorer countries, are looking for protein from capture and aquaculture fisheries. However, the over-exploitation of aquatic resources has disrupted the balance of the ecosystem, threatening the lives of the present and future generations; At the same time, human resources are not being used effectively at global, regional, national and local levels.

In addition, with the rapid population going up, the demand for fishery increases, this threatens fisheries resources. Many fishing vessels have been changed; fishing gear and fishing technology have been improved to exploit more fisheries. All these make the government more difficult to control the over-exploitation. Not only stopping there, the over-exploitation has created other consequences, such as breaking the ecological balance, threatening endangered species. Hence, FAO set up "Long-term goals of Sustainable development in capture fisheries" (Table 3).

Table 3: Long-term goals of Sustainable development in capture fisheries

To raise awareness of local people in fisheries management;
To encourage businesses to participate in fisheries management;
Co-management of fisheries in coastal areas;
To strengthen the legal framework;
For good control of activities destroying the marine environment;
To supervise and strictly handle violations;
Improve methods of collecting and sharing fisheries information and environmental information;
Changing awareness in the socio-economic field with the characteristics of the fisheries sector;
To adopt measures to develop aquatic resources and protect ecosystems;
To develop the fisheries sector in a sustainable manner, policies should be directed towards the protection of fisheries resources, good control of fisheries production, building the leading targets towards the sustainable development of fisheries:
Source: FAO, 1999

Relating to sustainability, World Bank implemented studying Vietnam fisheries sector in 2005. Accordingly, WB identified, "co-management" is the best approach to exploit sustainably and protect aquatic resources effectively because of resources management through consultation with fishers and the development of shared management responsibilities between fishers and government. "Co-management" is also able to support sustainable fisheries development because of improving awareness of sustainable management and use of aquatic resources. Of which, marine protection area (MPA) management is put as the first priority.

According to WB, inshore fisheries are very complex. Management of inshore fisheries often requires many human resources and financial resources of nation and coastal provinces, but it is still too difficult to manage effectively. On the other hand, offshore fisheries management is an activity not able to short of the support of the fishermen. Therefore, co-management and strengthening awareness of fishermen on sustainable use of aquatic resources is very necessary, even much more important than the fisheries law. Co-management is the only way to conserve and exploit sustainably.

2.1.2 Sustainable development in aquaculture

Also according to WB (2005), aquaculture is Vietnam's development priority because of being essential to meet growing demand for food, but aquaculture development particularly in coastal areas has caused environmental problems such as deterioration of coastal habitats and other negative impacts. Therefore, interventions are needed to improve environmental sustainability. Exactly, aquacultural projects need focus on natural resource management strategies like land and water linked to socio-economic development objectives.

To promote sustainable development in aquaculture, MOFI implemented capacity building programs to be possible to introduce new technology; Speeding up sustainable aquaculture planning; and Improving environmental management capacity. Environmental management in aquaculture is very essential for sustainable development. Substantial investment in environmental management is necessary if Vietnam wants to sustain its aquaculture growth.

From an environmental point of view, WB (2005) identified a number of reasons why aquaculture of Vietnam developed unsustainably. **Firstly,** water pollution from industrial and urban waste, affecting aquaculture. Pollution of water resources was associated with industrial sectors such as ship building, food processing, mining, production of chemical and fertilizer, steel making, oil refining, and others. Pollution got worse due to discharge of industrial and urban effluent directly into canals and rivers without treatment, causing surface water pollution and downstream pollution of coastal water bodies. While aquaculture production in Viet Nam was mainly conducted in coastal areas, particularly near the industrial and urban centers in the Red river delta of the North and Mekong river delta of the South. It was said that industrialization created a great deal of risk to the sustainable development of aquaculture. **Secondly,** harvesting wild seed for marine aquaculture proved to be poorly sustainable, because the wild seed stocks were depleted (decreasing from 100 to 10-20 fingerlings/day in Cat Ba and Ha Long marine areas). In the fact, number of seed did not meet demand in Vietnam. This was not only increasing pressure on natural resources, but also inducing Vietnamese farmers to import seed from China, with risks of pathogen. For that reason, Vietnam needed have strategy on producing high quality and disease free seed as well as limiting to harvest wild seed. **Thirdly,** using trash fish as a kind of feed was also a major concern related to environmental problem. With low cost, trash fish was popularly used in marine aquaculture; and farmers tended to give too much food to shrimp/fish. As a consequence, left food caused water pollution. Moreover, trash fish included aquatic species of early development stages, leading to depleting of natural resources, unsustainable aquaculture. Finding replacements for trash fish was

therefore a priority for aquaculture sustainability. **Fourthly, and last,** unsustainable exploitation of water resource had seriously negative impacts on the environment and society. In the Central Coast area of Vietnam, groundwater was exploited for salinity control in sandy shrimp farming. This obviously threatened the livelihood of communities by limiting freshwater for household consumption, agricultural activities, and other users/activities. In fact, groundwater bodies were vulnerable to pollution by seawater. Salinity intrusion was an unavoidable consequence of poor groundwater management and over-exploitation.

In 2006, the research of VIFEP (*Indicators of Sustainable aquaculture development in Vietnam*) pointed out that sustainable aquaculture is a concept refers to aquaculture activities that bring human welfare and social acceptance, effectively use natural resources, protect ecological environment, meet the demand of consumers, ensure the needs of the next generation without affecting the ecosystem. When it comes to the sustainable development of aquaculture, it must be appreciated the following things: The impacts of pond construction on the natural environment and biodiversity; The health of the organisms in the food chain; Effects of aquatic feed on the environment; Diseases and wastes from aquaculture production affect the natural environment; Socio-economic and public works; Natural aquatic organisms; and Impact on gene structure of natural populations.

In the same year, VIFEP developed a set of SD indicators for aquaculture. Of which, indicators play an important role in assessing sustainability of aquaculture relating to diseases, farmed aquatic species health, farms, farm management, genetics, broodstock quality, feed and nutrition for farmed shrimp/fish. According to VIFEP, economic-social indicators are less important. In contrast, indicators of monitoring and warning information on environment are more important.

2.2 Measure of sustainable development

In the world, the level of sustainable development is often determined by qualitative method through analysis, argumentation and synthesis; as well as being measured by quantitative method through sets of indicators for monitoring and evaluation of sustainable development. In this case, the sets of indicators are understood to be a integrated measurement of relevant information related to sustainable development. In Vietnam, VIFEP and D-Fish developed the sets of indicators in the years 2006 and 2012 respectively after the strategic direction of fisheries development in the 2001-2010 period and the strategy for development of Vietnam fisheries in the 2010-2020 period were issued.

2.2.1 Indicators for sustainable development of capture fisheries

According to the result of FAO study (1999), the set of SD indicators for capture fisheries must reflect the criteria of four dimensions. (Table 4)

Table 4: FAO's SD indicators for marine capture fisheries

Dimensions	Criteria
Economic	Harvested yield
	Harvesting value
	Contribute to GDP
	Export value (compared with total export value)
	Income from fisheries
	Invest in boats
	Tax and benefits
	Net profit
Social	Number of fish workers directly compared to the total number of participants
	Population
	Education
	Protein consumption
	Fishermen's income
	Traditional exploitation
	Loans
	Sex ratio in decision making
Ecological / Environmental	Output component
	The productivity of the exploited object
	Level of exploitation
	Impact of fishing gear on undesirable species

	Impact of the type of occupation to the level of nutrition
	The impact of the type of occupation to the place of residence
	Diversity (by species)
	Change in the area and quality of the place of residence or importance ecological restrictions
	Exploitation pressure on exploited and non exploited areas
Governance	Enforcement
	Assign ownership
	Clear uniformity in management
	Management capacity
Source: FAO, 1999	

Based on the results of the FAO study, VIFEP developed a set of SD indicators for capture fisheries. However, because in Vietnam, it is not possible to carry out an assessment all these criteria, can only to assess the important criteria, VIFEP selected a number of specific criteria for making the establishment of a set of SD indicators to exploit and protect aquatic resources. According to VIFEP, this set of indicators will assist Vietnam monitor fisheries development to ensure compliance with CCRF - *the Code of Conduct for Responsible Fisheries adopted by Vietnam and the member countries of FAO in 1995, defining the principles of sustainable fisheries management*. In addition, the set of indicators is also very suitable for Vietnam's conditions, because of the following reasons: Easy to understand; Easy to use to evaluate sustainable development; Low implementation cost; High accuracy; Easy to update; and Have scientific value.

Specifically, in 2006, VIFEP set up indicators for sustainable development to exploit and protect aquatic resources. The set of indicators provided technical guidance for sustainable fisheries development in Vietnam. This is a set of SD indicators for capture fisheries based on four areas of economy, society, environment, and management; Total 10 indicators for sustainable development, of which: 02 economic indicators, 02 social indicators, 02 ecological / environmental indicators, and 04 management indicators.

Table 5: VIFEP's SD indicators for marine capture fisheries

Economic	Revenue
	Rate of vessels operating efficiently on total vessels
Social	Number of direct laborers on the total number of employees
	Academic level
Ecological / Environmental	Total catching output
	Estimated reserves
Management	Quantity and capacity of vessels
	Number of Marine protection areas
	Number of people involved in fisheries co-management
	Number of managers is trained annually
Source: VIFEP, 2006	

2.2.2 Indicators for sustainable development of aquaculture

In the same year (2006), VIFEP developed a set of 30 indicators for sustainable development in the aquaculture sector to help Vietnam assess and determine the level of sustainable aquaculture development.

Table 6: Indicators for sustainable aquaculture development

1	Percentage rate of commercial culture areas involved in community management
2	Percentage rate of aquaculture areas involved in GAP
3	Percentage rate of the main aquaculture production reduced diseases annually
4	Origin of aquaculture products
5	Income gap in aquaculture
6	The issue of red books or green books for aquaculture
7	Percentage rate of farms with an area of more than 1 hectare with registered feeding pond number
8	Percentage rate of coastal provinces implementing sustainable aquaculture planning

9	Percentage rate of provinces having large fresh-water aquaculture scale and being planned
10	Percentage rate of provinces of which plan is implemented
11	Percentage rate of aquaculture system being assessed for sustainability by ASI
12	Rate of farming system adapted to market changes, social acceptance and environmental friendliness
13	Rate of products having lower price than the market price
14	Percentage rate of farmers crossing breakeven point and getting profit
15	Percentage rate of new aquaculture areas investing irrigation systems which meet safe farming standard
16	Percentage rate of old aquaculture areas investing irrigation systems
17	Percentage rate of infrastructure projects for aquaculture with sector involvement
18	Having more than 10 artificially-produced species having commercial value
19	Percentage rate of shrimp seed produced artificially from tame shrimps
20	Percentage rate of breeding farms being trained on good shrimp aquaculture practice (GAP)
21	Percentage rate of breeding farms being certified for quality breeding farms
22	Percentage rate of farms implementing EIA
23	Percentage rate of area or water level meeting clean technology standards
24	Percentage rate of protein in plant-derived food
25	Percentage rate of aquaculture areas on sand having an irrigation system providing sufficient fresh water for aquaculture
26	Percentage rate of aquaculture areas on sand using underground water for production
27	Percentage rate of quarantined introduced species on the total number of introduced species
28	Percentage rate of quarantined introduced species on the total number of species in Vietnam and introduced species
29	Percentage rate of staffs in Ministry of Fisheries trained on sustainable development
30	Percentage rate of implemented documents, decrees on sustainable development policy in aquaculture
Source: VIFEP, 2006	

2.2.3 Indicators for sustainable development of Vietnam fisheries

In 2012, D-Fish developed a set of indicators to monitor and assess the implementation of the development strategy of Vietnam fisheries up to 2020. This set of indicators covers almost all fisheries activities such as capture fisheries, aquaculture, processing and trading (including inland consumption and export) … Particularly, indicators were measured by the specific numbers regarding to the target of development strategy of Vietnam fisheries up to 2020.

Table 7: Indicators for sustainable development of fisheries sector

No.	Name of Indicators	Target of 2020
1	The share of GDP of fisheries sector in agro-forestry-fishery sector	30-35%
2	Growth rate of fishery production value	8-10%
3	Growth rate of seafood export turnover	4.94-6.18%
4	Total fishery production	8 million tons
5	Growth rate of Total fishery production	2.34-3.1%
6	Percentage of Catching production	30-35%
7	Percentage of Aquaculture production	65-70%
8	Total number of fishery employees	5 million people
9	Percentage of catching employees in Total fishery employees	30%
10	Percentage of aquaculture employees in Total fishery employees	70%
11	Growth rate of average income of fishery employees	30%
12	Proportion of trained fishery employees	40%
13	Proportion of coastal fishery communes built according to the new rural model	50%
Source: D-Fish, 2012		

Table 8: Indicators for sustainable development of capture fisheries

No.	Name of Indicators	Target of 2020
1	Percentage of captured fishery production in total fishery production	30-35%
2	Percentage of offshore capture fisheries production in total capture fisheries production	58.3%
3	Percentage of capture fisheries production after post harvest loss in total capture fisheries production	10%
4	Percentage of offshore fishing vessels in total number of fishing vessels (*Capacity of offshore fishing vessels is upper 90 CV*)	25.5%
5	Growth rate of total fishing vessel capacity	0%
6	Growth rate of the total capacity of offshore fishing vessels	4.1%
7	The number of offshore fishing vessels operating on the model of linking production on the sea in the total number of offshore fishing vessels	40%
8	The number of offshore fishing vessels managed by the fishing license (in line with the potential of fisheries resources in each sea area) in the total number of offshore fishing vessels	100%
9	The number of offshore fishing vessels provided the forecast of fishing grounds in the total number of offshore fishing vessels	100%
10	The number of offshore fishing vessels is equipped with satellite monitoring system in the total number of offshore fishing vessels	100%
11	Number of Marine Protected Areas MPAs	16
12	Number of inland water conservation zones	45
Source: D-Fish, 2012		

Table 9: Indicators for sustainable development of aquaculture

No.	Name of Indicators	Target of 2020
1	Growth rate of aquaculture production in the period 2011-2020	5.2%/ year
2	Growth rate of aquaculture production value in the period 2011-2020	2.95%/ year

3	Growth rate of aquaculture area in the period 2010-2020	0.91%/ year
4	Total area of aquaculture	1.2 million ha
5	Value of export turnover of aquaculture	5-5.5 billion USD
6	Percentage of aquacultural employees in the total number of fishery employees	70%
7	Pangasius output	1.5-2 million tons
8	Growth rate of pangasius output	4.8 %/ year
9	Production of brackish water shrimp	0.7 million tons
10	Growth rate of brackish water shrimp production	5.76 %/year
11	Mollusk production	0.4 million tons
12	Growth rate of mollusk production	16 %/year
13	Tilapia production	0.15 million tons
14	Growth rate of tilapia production	7.9 %/year
15	Seaweed production	0.15 million tons
16	Growth rate of seaweed production	7.2 %/ year
17	Production of freshwater prawn	0.06 million tons
18	Growth rate of freshwater prawn	11.6 %/ year
19	Proportion of disease-free, high quality, locally produced aquatic breeds in total number of aquatic breeds	75%
20	Percentage of aquaculture area damaged due to environmental pollution and disease in the total area of aquaculture	-
21	Proportion of aquaculture areas meeting GAP standards and other sustainable aquaculture management processes to the total aquaculture area	-
Source: D-Fish, 2012		

Table 10: Indicators for sustainable development of processing and trading

No.	Name of Indicators	Target of 2020
1	Proportion of units producing and trading fishery products meeting the requirements of food hygiene and safety in the total number of units producing and trading fishery products in Vietnam	-
2	Proportion of number of seafood processing units meeting the requirements of food hygiene and safety to the total number of seafood processing units in Vietnam	-
3	Proportion of fishery products that meet the requirements of food hygiene and safety to the total volume of fishery products of Vietnam	-
4	The average growth rate of processed fishery production for export in the period 2010-2020	3.5 %/year
5	The average growth rate of processed fishery production for domestic consumption in the period 2010-2020	3.3 %/year
6	Proportion of value added products to total volume of processed products	60-70%
7	Proportion of value of seafood exports in 3 major markets (EU, Japan, US) to total seafood export turnover	60%
Source: D-Fish, 2012		

The majority of the data in the four tables above is the economic and social statistics annually published by the General Statistics Office (GSO), while the few remaining data collected from many other sources because of rules and regulations in Vietnam. For example, exporting data is sum up and announced by the General Department of Vietnam Customs (GDVC) every year.

For some indicators, the Directorate of Fisheries (D-Fish) will conduct a socio-economic baseline survey to collect data for the monitoring and evaluation, of which, taking the 2010 milestone and the calculation year of 2020; or through a statistical survey to collect data for the evaluation of indicators; or use the statistical data of the New Rural Program to assess indicators. For establishments producing, processing and trading aquatic products, the National Agro-Forestry-Fisheries Quality Assurance Department (NAFIQAD) sum up and announce the number of establishments meeting food hygiene and safety requirements; the volume of seafood meets the requirements of food hygiene and safety in the total volume of fishery products of Vietnam.

In addition, the results of the surveys on marine resources in Vietnam belonged to Research Institute for Marine Fisheries (RIMF). Information on processed seafood and value added products is managed, aggregated and published by Agro Processing and Market Development Authority (Agrotrade Vietnam). Once a year, Departments of Agriculture and Rural Development (DARD) of coastal provinces/cities carry out an assessment of local fishing vessels; after that, the Ministry of Agriculture and Rural Development (MARD) will aggregate the data to produce results. However, some of them are indicators that not to be publicly disclosed.

CHAPTER 3. RESEARCH METHODOLOGY

3.1 Research method and Data collection

This thesis uses the following basic methods: collecting documents as secondary data and primary data including interview, seminars, workshops, conferences, meetings, and forums. Secondary material is collected from books, magazines, reports, statistics, and internet; especially, the survey results of the previous studies. Document synthesis is done firstly, by applying a combination of qualitative and quantitative methods to carry out document analysis; secondly, there is a synthesis and evaluation of all the contents of the collected documents. Finally, interviews with fisheries management agencies at ministry level and local level, leaders and fisheries experts have been collected. (*The survey/interview questionnaires are presented in Appendix 2 and Appendix 3*)

Exactly, the thesis uses secondary information from reports of central and local government, state management agencies, scientific research institutes, statistical data of General Statistics Office and provinces, and the study results, such as results of the independent research consultant team on "Evaluating the negative social impacts of brackish water aquaculture in Vietnamese coastal provinces". This team whose leader selected by the project "Support marine and brackish water aquaculture" (SUMA). Although the project completed in the end of 2005, I still decided to use the results of the project as references because of its value. The project conducted 35 group discussions, 64 in-depth interviews with leaders and managers of local level, and 1,150 submissions in 10 provinces (Quang Ninh, Hai Phong, Nam Dinh, Phu Yen, Khanh Hoa, Ninh Thuan, Ca Mau, Bac Lieu, Soc Trang, Ben Tre). These provinces represented for the Red River Delta, the North Central area, the Central Coastal area, the South East area and the Mekong River Delta.

In particular, I conducted 25 interviews with open-ended questions - the best way to collect data on personal opinion, viewpoint and experience. I chose the interviewees based on their careers. They were leaders, managers and fisheries experts. Before interviewing, a list of questions and main talking points had been sent to the interviewees. The content of interviews focused on sustainable development of Vietnam fisheries. It took about 30 minutes for each interview. However, recording was not allowed during the interview because of sensitive comments, so I rewrote the interview information.

25 in-depth interviews with open-ended questions were for a smaller group of respondents, included a former Minister of Fisheries (MOFI), two former Vice-Ministers of Fisheries; some leaders of Directorate of Fisheries (D-Fish) such as Vice-Director of Department of Aquaculture, Director and

Vice-Director of Department of Capture Fisheries, Director of Department of Legislation and Inspection, Director of Department of Aquatic Resources Conservation and Development, Director and two Vice-Directors of Department of Fisheries Resources Surveillance, two former Directors of Fisheries Information Center, Vice-Director of Center for Registration of Fishing Vessels, Director and Vice-Director of Department of Analysis and Verification Center for Aquaculture; some leaders of Research Institute for Aquaculture Numbers 1, 2 and 3 (RIA1, RIA2, and RIA3), some leaders of Research Institute for Marine Fisheries (RIMF), Director and Vice-Director of Vietnam Institute of Fisheries Economics and Planning (VIFEP), and fisheries specialists of universities.

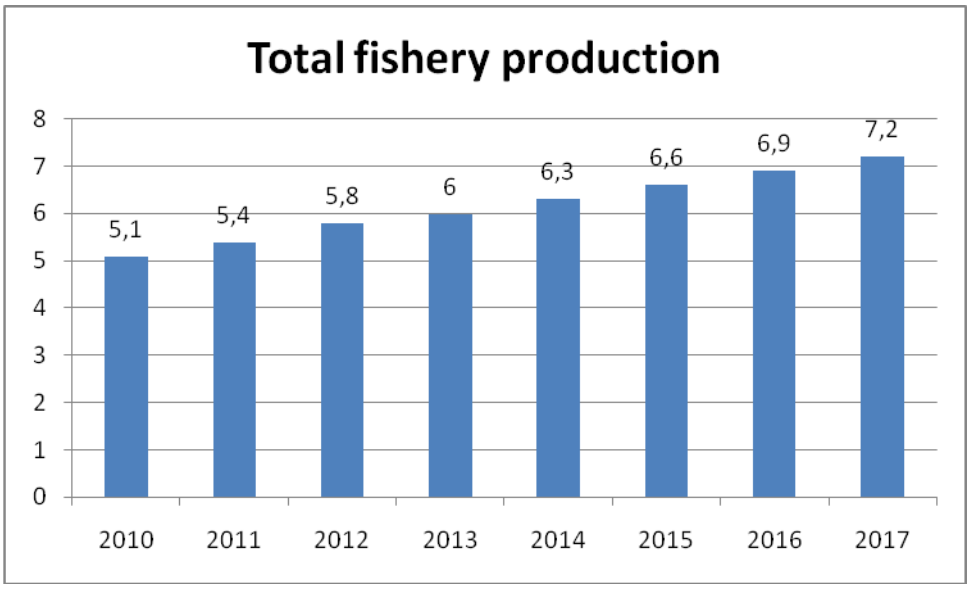
Generally, the data was collected from many sources of FAO, GSO, GDVC, D-Fish, VIFEP, RIMF, MARD, DARDs and the other organizations/offices in and out of Vietnam. The information was possible extracted from publications (books, magazines), scientific reports, statistics data, and online text. It was also possible the information gathered from the interviews or knowledge learning from conferences, seminars, scientific forums. In particular, the thesis referenced, selected and used some results of surveys, too. And all the data collected will be analyzed in the following section.

3.2 Data analysis

After the process of actively collecting data, I had statistical data from official sources of the General Statistics Office (GSO), the Ministry of Agriculture and Rural Development (MARD), the Research Institute of Marine Fisheries (RIMF) and the other useful information sources. Especially, I used data in the "Statistical Yearbook 2017" (published in 2018), the statistical reports of the Ministry of Agriculture and Rural Development (from 2010 up to now), and "The results of survey on marine fisheries resources in Vietnam 2011-2015" of the Research Institute of Marine Fisheries (reported in April, 2018). At the same time, I extracted data from secondary material (such as books, magazines, reports, documents, papers of conferences, seminars, workshops, meetings, and forums); selecting to use the survey results of the previous studies.

In order to answer the research question "What is the status of the fisheries sector in Vietnam?", I collected the data from a variety of sources, mainly official sources of GSO, MARD and RIMF, combined with sustainable development indicators of D-Fish (2012), and then, with my available knowledge, skill and experience, and worthy knowledge gained from the process of study to do this thesis, I conducted data analysis in a scientific way.

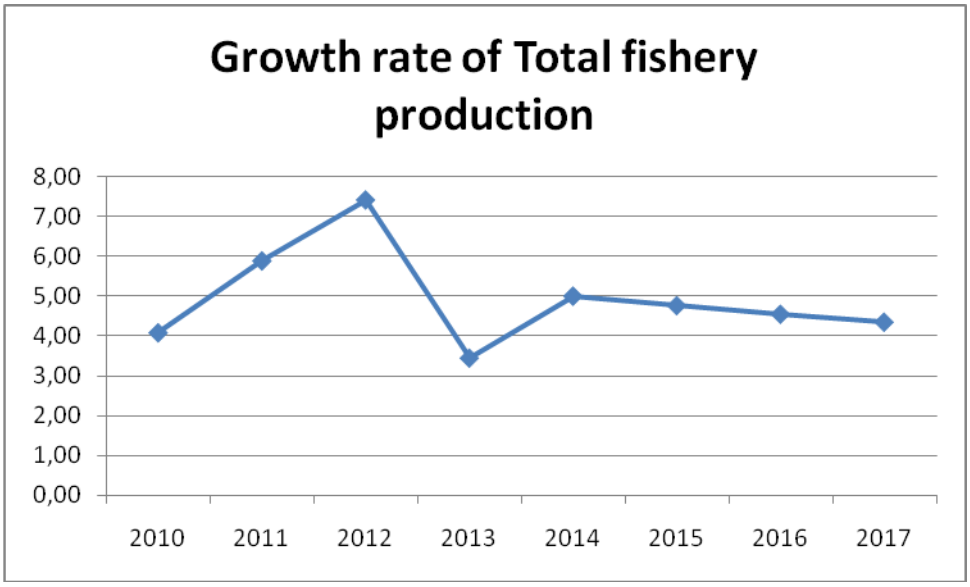
Chart 1: Total fishery production



Source: Vietnam General Statistics Office , 6/2018

According to D-Fish, the sustainable development target of total fishery production is 8 million tons in 2020. Looking at Chart 1, this indicator can be reached.

Chart 2: Growth rate of Total fishery production

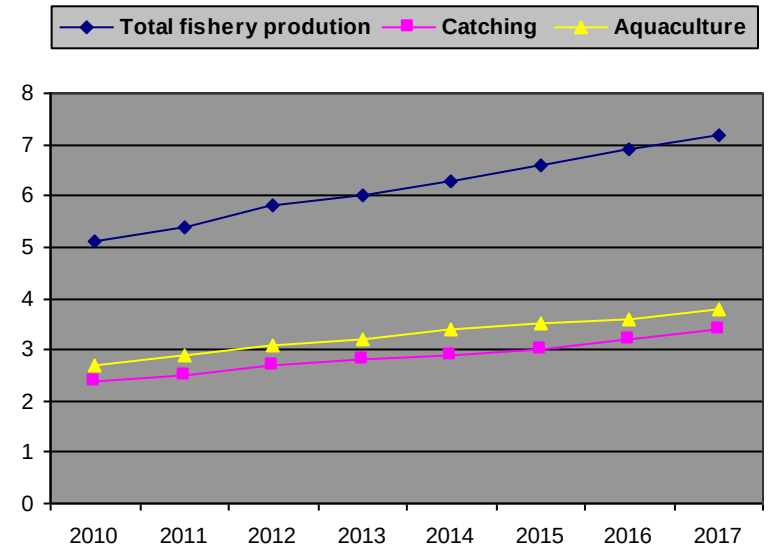


Source: Vietnam General Statistics Office , 6/2018

According to D-Fish, the sustainable development target of the growth rate of total fishery production is **2.34 - 3.1%** during the period of time between 2010 and 2020. Nevertheless, in fact,

the average growth rate was **4.93%** (nearly double as requirement). The question is "This dramatically increase was due to the growing of catching production or aquaculture production or both of them".

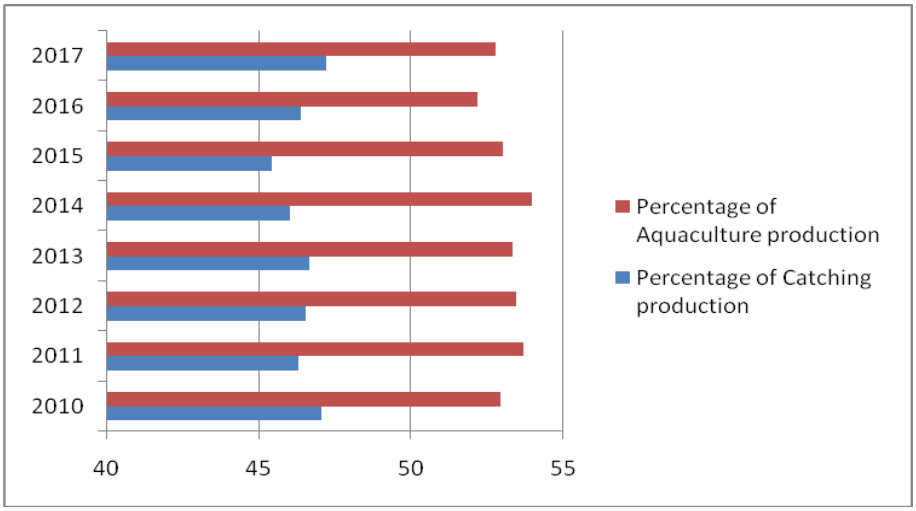
Chart 3: Fishery production indicators



Source: Vietnam General Statistics Office , 6/2018

Chart 3 answered for the question above: The increase of total fishery production was due to both of the growing of catching production and aquaculture production.

Chart 4: Proportion of Aquaculture and Capture fisheries production



Source: Vietnam General Statistics Office , 6/2018

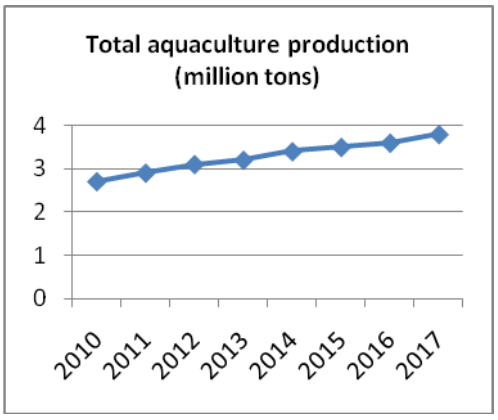
According to D-Fish, the sustainable development target of fishery production is that the aquaculture production accounts 65-70% in the total fishery production, while the capture production accounts 30-35% in the total fishery production in 2020. Nevertheless, in fact, the average rate of aquaculture production 2010-2017 was only about 54% (lower than the target), whereas the average rate of catching production 2010-2017 was above 46% (higher than the target). Therefore, these indicators are fail. The predicted reasons are: (1) Low aquaculture productivity because of ineffectively applying advanced technologies; (2) Poor management leading to over-exploitation.

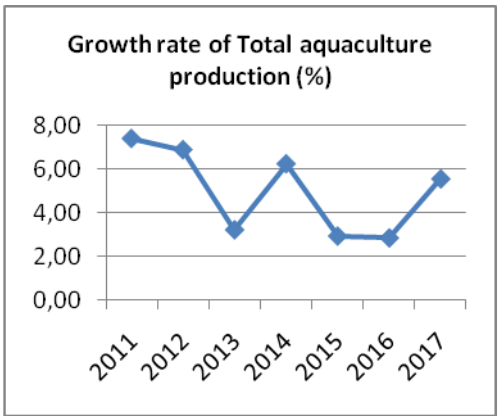
Table 11: Evaluation of Growth rate indicator of Total aquaculture production

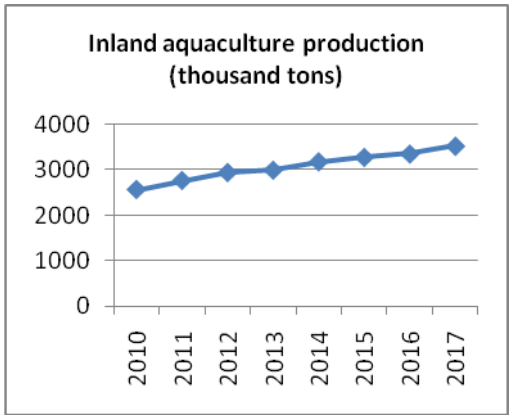
	2011	2012	2013	2014	2015	2016	2017	Avg.
Growth rate of Total aquaculture production (%)	7.41	6.90	3.23	6.25	2.94	2.86	5.56	**5.0**
Source: Vietnam General Statistics Office , 6/2018								

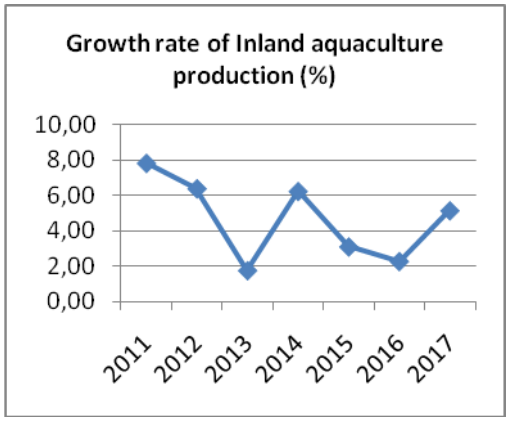
According to D-Fish, the sustainable development target of the growth rate of total aquaculture production is **5.2%** in 2010-2017. Looking at Table 11, this indicator cannot be reached. The predicted reasons are: Low aquaculture production because of subjective reasons such as ineffectively applying advanced technologies; or objective causes such as climate change.

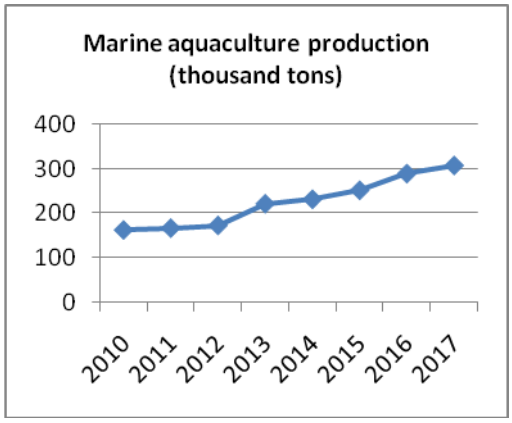
Chart 5: Growth rate of Aquaculture production

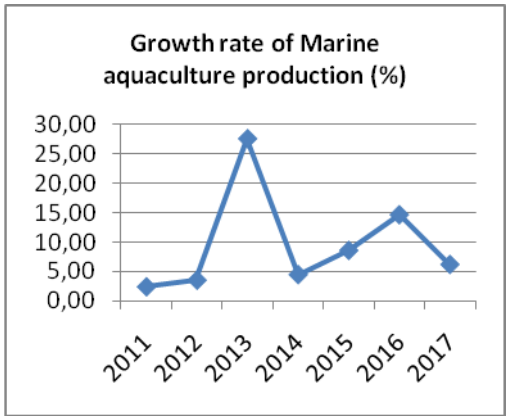








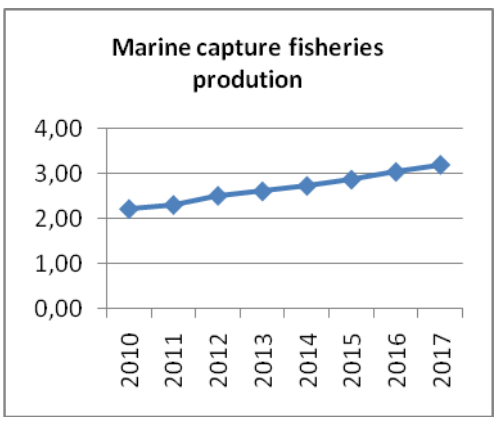




Source: Vietnam General Statistics Office , 6/2018

At first glance, three indicators of Chart 5 - Total/ inland/ marine aquaculture productions were seen to increase continuously from 2010 to 2017. Nevertheless, looking at the growth rate indicators will see clearly fluctuations through years (the previous year increased dramatically, the next year increased slightly and vice versa). The predicted reasons are: There are factors influencing these growth rates, may be due to weather or disease.

Chart 6: Growth rate of Marine capture fisheries production



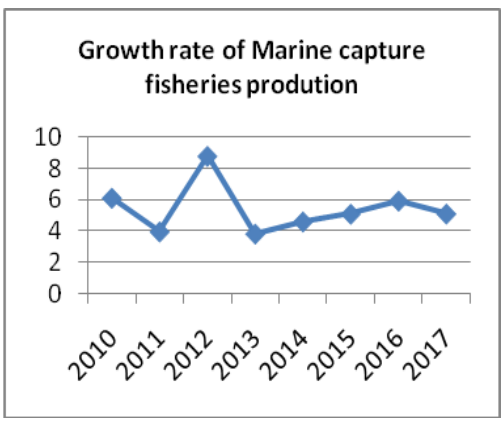


Table 12: Growth rate of Marine capture fisheries production

Year	2010	2011	**2012**	2013	2014	2015	2016	2017
Marine capture fisheries production (million tons)	2.22	2.31	2.51	2.61	2.73	2.87	3.04	3.19
Growth rate of Marine capture fisheries production (%)	6.12	3.96	**8.80**	3.82	4.60	5.10	5.93	5.11

Source: Vietnam General Statistics Office , 6/2018

Looking at Chart 6 and Table 12, the marine capture fisheries production increased rather steadily over the years with a fluctuation of 4-6%, except a spike in 2012 (approximately 9%). It is said that the rise in marine capture fisheries production is not good, as it can lead to resource depletion.

Table 13: Evaluation of Development indicators of upper 90 CV offshore fishing vessels

Year	2014	2015	2016	2017	**Average**
Number of upper 90 CV offshore fishing vessels (pcs)	27,679	28,719	30,472	32,878	~30,000
Growth rate of Number of upper 90 CV offshore fishing vessels (%)		3.8	6.1	7.9	5.9
Total capacity of upper 90 CV offshore fishing vessels (CV)	8,085	9,389	10,688	12,339	~10,000
Growth rate of Total capacity of upper 90 CV offshore fishing vessels (%)		16.1	13.8	15.4	**15.1**

Source: Vietnam General Statistics Office , 6/2018

According to D-Fish, the sustainable development target of the growth rate of total capacity of upper 90 CV offshore fishing vessels is **4.1%** in 2020. Nevertheless, in fact, the number of upper 90 CV offshore fishing vessels increased rapidly with average yearly number of 30,000 pieces; the total capacity of offshore fishing vessels boosted with average speed of **15.1%**, increasing at a rate of nearby four times of sustainable development target. Therefore, forecasting for a good condition and a bad condition: (1) To shift production structure, enhance off-shore exploitation, limiting near-shore fishing in order to protect the coastal resources which are in danger of being exhausted; or (2) Not control well exploitation of upper 90 CV offshore fishing vessels, leading to over-exploitation.

Table 14: Seafood stocks and Catching production (thousand tons)

Marine areas of Vietnam	Surveys 2000-2005			Surveys 2011-2015		
	Seafood stocks (1)	Catching production (2)	Comparison (2)/(1)	Seafood stocks (3)	Catching production (4)	Comparison (4)/(3)
Northern Gulf	586,369	249,835	43%	756,900	471,812	62%
Central Coast area	1,187,700	534,325	45%	**868,200**	**1,093,645**	**126%**
South East area	1,075,650	460,725	43%	1,119,200	1,079,179	96%
South West area	1,069,392	440,146	41%	584,200	456,678	78%
Middle area of East Sea	1,156,032	462,413	40%	**1,035,900**	**0**	**0%**
Total	5,075,143	2,147,444	42%	4,364,400	3,101,314	71%

Source: Reports of RIMF in 2007 and 2018

Looking at Table 14, the total stock decreased by 14% (from 5,075 thousand tons to 4,364 thousand tons) mainly due to a decrease in the Central Coast area and the South West area. In the period of 2000-2005, the exploitation in the sea areas was conducted reasonably and sustainably - The exploited output in each sea area accounts for around 40% of the stock in that sea area. However, during the survey period 2011-2015, the exploitation on all the sea areas has shown signs of irrationality. Exploitation output increased sharply (accounting for 62-96% of the reserve). In the Central Coast area, there was even an over-exploitation (exceeds 26%, equivalent to about 230 thousand tons); Average stock is about 870 thousand tons, while the average catch of this period is approximately 1,100 thousand tons. In contrast, the Middle area of the East Sea has huge reserves (1.036 thousand tons), but Vietnam did not exploit as before.

Looking at Table 15 below, it is clearly that the risks of the Central Coast area and the South West area have been getting worse – the seafood stocks declined sharply, whereas the catching production rose. If there are no timely solutions, it will result in the depletion of fisheries resources, which causes unsustainable exploitation.

Table 15: Seafood stocks and Catching production (thousand tons) in 2016-2017

Marine areas of Vietnam	2000-2005		2011-2015		2016	2017
	Seafood stocks	Catching production	Seafood stocks	Catching production	Catching production	Catching production
Northern Gulf	586,369	249,835	756,900	471,812	247,742	267,452
Central Coast area	**1,187,700**	534,325	**868,200**	1,093,645	**1,263,232**	**1,329,150**
South East area	1,075,650	460,725	1,119,200	1,079,179	330,229	349,328
South West area	**1,069,392**	440,146	**584,200**	456,678	**1,220,709**	**1,305,360**
Middle area of East Sea	1,156,032	462,413	1,035,900	0	0	0
Total	5,075,143	2,147,444	4,364,400	3,101,314	3,226,100	3,395,500

Source: RIMF (2007; 2018) and MARD (2017)

In summary, through the data processing, analysis, arguments and synthesis in a scientific way, combination of qualitative and quantitative methods, the data was turned into meaningful numbers, showing some basic features of the development status of the fisheries sector in Vietnam. Initially, it can be said that Vietnam fisheries sector has been developing unsustainably, expressed in some issues. Firstly, the total output of fisheries is still growing strongly through years (Chart 2) and can achieve the development target of 8 million tons by 2020 (Chart 1) but do not meet the criteria of the ratio of catching and aquaculture production. Specifically, catching production accounted for 46% (higher than the required of 30-35%), while aquaculture production was low, reaching only 54% comparing with the required level of 65-75% of the total output (Chart 4). The initial cause was identified, as the growth rate of aquaculture production was not satisfactory (Table 11). Secondly, the increase in the number of fishing vessels and the increase in total capacity (Table 13) has led to an increase in fishing yields (Chart 6 and Table 12) but this was not good, because there was over-exploitation in some of Vietnam's waters (Table 14 and Table 15), resulting in depletion of fisheries resources and unsustainable exploitation.

CHAPTER 4. FINDINGS

After analyzing the data (in Section 3.2) and implement the study steps (as described in Section 3.1), combining all the results with the thought-deepening, I have determined the development status of the fisheries sector in Vietnam and the level of sustainable development of the fisheries sector.

4.1 The current situation of Vietnam fisheries sector

4.1.1 The recent results of fisheries activities

In recent years, the fisheries sector in Vietnam has pushed up production and exports to achieve impressive results, significantly contributing to national GDP. Specifically, in the agriculture, forestry and fishery sector, the fishery sector had the highest growth rate of 5.54%, as the fishery production in 2017 was more prosperous compared to 2016, contributing 0.17 points percent on the overall increase. Total fishery output in 2017 reached 7,225 thousand tons, up 4.3% against 2016, of which fish reached 5,192.4 thousand tons, up 4.8% over 2016; shrimp reached 887.5 thousand tons, up 8.8% compared to 2016.

Aquaculture production in 2017 reached 3,835.7 thousand tons, up 5.6% over 2016, of which fish reached 2,694.3 thousand tons, up 4.2% over 2016; shrimp reached 723.8 thousand tons, up 10.3% compared with 2016. Tra fish output in 2017 reached 1,251.3 thousand tons, up 5% compared with 2016; Black tiger shrimp production reached 254.9 thousand tons, up 4.4% compared with 2016; White leg shrimp output reached 432.3 thousand tons, up 14.3% compared with 2016.

The total capture fisheries production of the whole country in 2017 was 3,389.3 thousand tons, increasing by 6.3% against 2016, of which fish was 2,498.1 thousand tons, increasing 5.4% and shrimp was 163.7 thousand tons, up 2.6%. Marine capture fisheries production reached 3,191.2 thousand tons, up 5.1%, of which fish reached 2,363.8 thousand tons, up 5.4%, shrimp reached 150.2 thousand tons, up 2.8%.

According to the Vietnam Association of Seafood Exporters and Producers (VASEP), Vietnam's seafood exports in 2017 reached over 8.3 billion USD, an increase of nearly 19% over 2016. The largest contributor to fisheries exports was still the shrimp with the growth rate of over 21%, the export value was 3.8 billion USD. Next came pangasius of nearly 1.8 billion USD, despite the difficulties in many markets but a total increase of nearly 4% compared to 2016. Exports of tuna

and squid, octopus are capable reached nearly 600 million USD, up 16% and 42% respectively compared with 2016.

Remarkably, in terms of seafood exports in 2017, China has surpassed the United States in the top import markets of Vietnam's pangasius and shrimp. With a 37% increase in 2017 and an import value of 420 million USD, China leaded the pangasius market and was the third largest shrimp import market after the European Union (EU) and Japan with a value of 677 million USD, up over 60% over 2016.

In addition to the achievements, in 2017, the fisheries sector in Vietnam also encountered many difficulties and obstacles. It is the competition of raw materials from foreign countries such as Ecuador, India, as well as source of shrimp, cod, catfish raw materials of the US, technical barriers of importers, and the protection of aquatic products in the process of catching, exploiting.

Unstable material is a major limitation of Vietnamese fisheries in recent years. At times, the price of Pangasius material in the Mekong River Delta increased (mid-2017) but farmers did not have enough fish to supply. At the same time, in the face of stringent requirements of importers such as ASC, BAP, HACCP and other requirements under the US Farm Bill Act, materials are not as much as the market expects. Many seafood processing and exporting companies also have difficulties when raw materials such as tuna, mollusk shellfish such as clam and blood cockle, which are MSC certification, are not enough for processing.

Furthermore, the technical barriers to quality standards and environmental safety have caused considerable damage to the seafood processing and export industry of Vietnam. Right from the beginning of 2017, Vietnamese shrimp faced major difficulties from the Australian market as the Australian Department of Agriculture and Natural Resources issued a ban on imports of under-cooked shrimp into Australia. With the ban in the first 6 months of 2017, the export turnover of Vietnamese shrimp has been considerably affected.

Until the ban was lifted and came into effect on July 6, 1977, shrimp exports to the Australian market rebounded. Along with that, the pangasius industry also faces US anti-dumping tax. The US is a market that accounts for 20% of the export value of Vietnamese pangasius, but is also a place where catfish (catfish and cod) production is similar to that of pangasius.

In 2018, the fisheries sector targets to increase the value of aquaculture from 5.3% to 5.8%. The total output of aquatic products is from 7.0 to 7.5 million tons. Of which, shrimp farming is 750

thousand tons, up 3.6%; Pangasius production reached 1.3 million tons, an increase of 3.9% compared to 2017. A target of seafood exports in 2018 is 9 billion USD. Along with the rapid development of enterprises and farmers, from breeding, farming and processing, the fisheries sector is expected not only to fulfill the plan but also to create a new milestone.

Table 16: Vietnam Fisheries Production in 2017

Indicators	Production (thousand tons)	% increase/decrease over 2016
Aquaculture production	3835.7	+5.2
Capture production	3389.3	+5.1
Total fisheries production	7225.0	+5.2
Source: General Statistics Office of Vietnam, 6/2018		

From difficulties and advantages in 2017, the Vietnam Association of Seafood Exporters and Producers (VASEP) said that in 2018, Vietnam's total seafood export turnover is expected to continue to grow positively due to the shrimp products and export flexibility to other major markets such as China, Japan and Korea. It is forecasted that seafood exports in 2018 will reach over 8.5 billion USD, up about 3% compared with 2017.

Besides the advantages, in 2018, it is forecasted that there will be many difficulties and challenges for the Vietnamese fisheries sector. Europe has applied the “yellow card” for Vietnamese seafood, strict inspection of trace origin for seafood imported from Vietnam. In parallel to that, regulations against illegal fishing and seafood from the United States came into effect on January 1, 2018.

The Ministry of Agriculture and Rural Development warned that despite the advantages, in 2018, the fisheries sector still faces many challenges, so the sector cannot be subjective. Particularly, the weather in the context of climate change continues unpredictable and fierce; Problems from the breeding and processing such as residues of antibiotics, impurities in the products; Meanwhile, there are still tax risks, inspection programs, and “yellow card” of EU on IUU fishing.

4.1.2 Co-management in aquatic resources conservation

Regarding co-management in aquatic resources conservation, Fisheries Law 2017 regulated individuals/households, when meeting the conditions set by the State, will be given the right to manage and protect fishery resources. The conditions are: (1) Individuals/households must live and benefit from fisheries resources in the area designated by the State for co-management; (2)

Individuals/households must register to participate in co-management in a defined geographic area - where no management has been delegated to any organization or individual. At the same time, individuals/households are considered members of the community organization, recognized by the state and assigned co-management and protection of fisheries resources. Community organizations must have operational regulations and plans to protect and exploit fisheries resources. The Fisheries Law 2003 does not regulate the above contents, but only regulates the direction of community-based fisheries management.

From the experience of the pilot models have been implemented on co-management and lessons learned from other countries around the world, the Fisheries Law 2017 regulates all issues related to co-management. These include Concepts (Co-management, Community Organization); Conditions for participation in Co-management; The competent authority recognizes and grants management rights to the Community Organization; Rights and responsibilities of the parties (competent authority, community organization). This provision aims to create a legal basis for the State to share and give management rights to community organizations in protecting fisheries resources, encouraging people, and associations to participate in co-management of activities of fisheries resource protection.

This regulation also aims to raise awareness and responsibility of people in fisheries resource protection, step by step implement the policy of socialization, strengthen the role and responsibility of the community in management and protection of fisheries resources. Implementation of co-management is an effective solution to reduce conflicts of interest in the community, contributing to the sustainable use of fisheries resources.

The specific activities

At the end of May 2018, Directorate of Fisheries (D-Fish), the Centre for Marine Life Conservation and Community Development (MCD), the Small Grants Programme of Global Environment Fund of UNDP (SGP UNDP/GEF) and Department of Agriculture and Rural Development of Binh Dinh Province (Binh Dinh DARD) organized the events regarding to the Draft legal documents guiding implementation of Fisheries Law 2017.

Fisheries Law 2017 provides for co-management in the exploitation and protection of fisheries resources. This is an entirely new and important point regarding the sharing of rights and responsibilities for the management, protection and exploitation of fisheries resources. Accordingly, the State allows community organizations to manage, aquaculture, protect and exploit aquatic

resources. Community organizations legally recognized in the conservation and development of fisheries resources.

In the series of activities related to this event, there was a consultative workshop on the draft decree guiding co-management in the conservation and development of fisheries resources; regulations on conservation fund and development of fisheries resources; draft guidelines for management of marine protected areas (MPAs); Workshop on sharing experiences in co-management, protection and exploitation of fisheries resources, recommendations on guiding the implementation of Fisheries Law 2017.

About 70 participants attended these events, including relevant units in Binh Dinh province such as DONRE, DOJ, DOST, DPI, DOT, Quy Nhon's PC, Districts and Communes' PCs where implementation of aquatic resources protection community-based models have placed, Sub-Department of Fisheries, Sub-Department of Sea and Islands, Associations, Cooperatives, Management Board of Nhon Hoi economic zone, Enterprises, Co-management groups; Sub-Departments of Fisheries in coastal provinces in Thanh Hoa, Nghe An, Ha Tinh, Phu Yen, Khanh Hoa, Soc Trang, Quang Nam, Quang Ngai, Thua Thien Hue, Binh Thuan, Ca Mau, Dak Lak; MPAs' Management Boards of Cu Lao Cham, Ly Son, Hon Cau; Fisheries Association and community groups in Binh Thuan province; Thanh Hai Commune's PC and community groups in Ninh Thuan province; international organizations such as IUCN, WWF and fisheries experts.

Fisheries Law 2017 is the important legal foundation in order to mobilize resources of local fishermen into responsible protection and exploitation towards sustainable fisheries. Accordingly, the law will officially come into effect from 1.1.2019. Therefore, state management agencies should prepare legal documents (under Law) such as the Decree, Circular guiding the implementation of Fisheries Law 2017. The authorities positively patrol, monitoring and management of aquaculture, capture fisheries and other fisheries activities; To strictly handle violations. Pursuant to the Fisheries Law 2017, community organizations should play a role in the management and prevention of violations in the areas assigned by the State; Establishment of community funds; Propagate the application of supportive policies under the Fisheries Law 2017.

During the workshops, the Vice Director of Department of Aquatic Resources Conservation and Development presented, in turn, issues such as the draft documents on co-management in the conservation and development of fisheries resources, the fund for conservation and development of fisheries resources, guidelines on management of marine protected areas (MPAs). Also at the

workshops, the participants totally agreed with the contents of the draft, and commented on the draft legal documents guiding the implementation of the Law of Fisheries 2017. At the sharing workshop, many participants expressed their local experiences in protecting the ecological environment, protecting coral reefs in combination with tourism development. Also at the sharing workshop, delegates emphasized the implementation of Article 10 of the Fisheries Law 2017, as this is the Article on the allocation of management rights on protection of fisheries resources for community organizations in the coastal area of Vietnam.

4.1.3 Sustainable management and use of aquatic resources

Fisheries Law 2017 stipulates that the results of survey and assessment of fisheries resources and habitats of aquatic species are an important basis for the management of capture fisheries under quotas to ensure sustainable capture fisheries on the basis of aquatic resources available in Vietnamese waters. Specifically, the law stipulates that every 5 years, the survey and assessment of fisheries resources and habitats of aquatic species must be conducted. Based on that, competent state management agencies shall determine fishing license quota for fishing vessels; Determine the volume of seafood allowed to be exploited for some species such as tuna and grouped fisheries species to protect aquatic resources and ensure effective and sustainable capture fisheries.

The purpose of the survey and assessment of fisheries resources and habitats of aquatic species is to collect information, data and scientific basis for the sustainable management and use of fisheries resources; determine the reserves and output to exploit and assess the fluctuation of fisheries resources and the quality of habitats of aquatic species.

There are 03 programs to survey and assess the aquatic resources and habitats of species in Vietnam: (1) General survey and assessment of fisheries resources and habitats of aquatic species on the whole country every five years; (2) Surveying and evaluating commercial fishery annually; (3) Survey and assessment of fisheries resources and habitats of aquatic species by thematic fields. In particular, the general surveys and the thematic surveys are conducted at Ministry level; while Local level (exactly Provincial People's Committees) carries out two kinds of survey - thematic survey and commercial fisheries survey.

Results of survey and assessment of fisheries resources

In 4/2018, RIMF sent a report to MARD, and posted on RIMF's website "The results of survey on marine fisheries resources in Vietnam 2011-2015". This report has provided very useful information

to help Vietnam Fisheries sector manage and use fisheries resources sustainably. Because it is an important scientific basis for the management of quota-based capture fisheries, ensuring sustainable exploitation based on reserves of existing fishery resources in Vietnamese waters.

Table 17: Results of survey on marine resources in Vietnam 2011-2015

1	Survey results of major marine fisheries groups (including large pelagic, small pelagic fish, bottom sea fish), focusing on marine species of economic value and dominate in each area of Vietnam
2	Survey results of marine fish stocks in each sea area and fisheries production in that sea area
3	Survey results of commodity seafood groups in each exclusive economic zone of Vietnam (EEZ)
4	The result of survey on seafood stocks in coastal areas of each province and marine capture fisheries production in these areas, focusing on groups of fish, crustacean and cephalopods (including squid, cuttlefish and octopus). The survey was conducted according to Decree 33/2010/ND-CP of the Government of Vietnam.
5	Results of the survey on reproduction seasons in sea waters of Vietnam; Survey results of spawning grounds and breeding grounds in Vietnam waters; Survey results of 18 MPA on the whole country *(This is useful scientific information for the protection of marine resources)*

Source: RIMF, 4/2018

4.1.4 Overcoming "yellow card" of the EU

On 23/10/2017, the European Union (EU) officially issued "yellow-card" warning for Vietnam's seafood exports to the EU market. At the same time, the European Commission (EC) made nine recommendations that Vietnam should implement immediately in 6 months (from 23/10/2017 to 23/4/2018). This is a challenge for Vietnam fisheries. However, this is also an opportunity for fisheries sector to be more responsible and sustainable. "The process of overcoming the recommendations of EC is not a countermeasure. Vietnam needs to continue to endeavor to ensure that it is building a sustainable fishery in the future". This is the opinion of a Deputy Minister of Agriculture and Rural Development about the process of overcoming the "yellow card" of the EU for Vietnamese seafood. (*Nine recommendations of EC are presented in Appendix 4*)

According to the Minister of Agriculture and Rural Development, Vietnam has focused on implementing synchronously and decisively the actions under the 9 recommendations of the EC; Taken initiative in building a sustainable fishery, a responsible fishery and adhering to international regulations. Specifically, Vietnam has focused on revising the legal document system, focusing on the Fisheries Law of 2017 passed by the National Assembly. The content of international fisheries management regulations as recommended by the EC has basically been domestication in the Fisheries Law of 2017. While the Fisheries Law of 2017 has not yet entered into force, the Prime Minister, Ministry of Agriculture and Rural Development, and People's Committee of provinces issued Directive, Official Order and Action Plan to immediately implement the recommendations of the EC.

“The Government has agreed to set up an interagency working group which will assign the Minister of Agriculture and Rural Development to be the leader to direct and urge localities and related parties to implement the national anti-IUU action plan. The authorities have focused on propaganda and awareness raising for fisheries management agencies, businesses, and fishermen to change awareness as well as exploitation, trading and use of IUU seafood”, the Minister emphasized. In fact, in the implementation of the EC’s recommendations, in addition to improving the legal framework towards sustainable capture fisheries management, the highlight is that functional authorities have intensified the supervision of fishing vessels and organized the patrol and maritime control activities to step by step prevent, minimize and proceed to eliminate the IUU in foreign sea areas.

The Deputy Minister of Agriculture and Rural Development said that after Vietnam has implemented drastic measures, the situation of fishing vessels and fishermen who illegally fish in foreign waters has been significantly reduced. Especially, to date, there are no Vietnamese fishing vessels in the Pacific Islands. At present, only cases of fishing vessels and fishermen have been arrested and dealt with in the overlapping and dispute sea areas due to not clearly defined. In the process of overcoming the “yellow card” of the EC, up to now, the promotion of information and propaganda widely on the mass media from the central to local levels has helped the fisheries managers and fishermen are aware of the anti IUU, the sense of law enforcement of fishermen has improved.

The Deputy Minister emphasized: "Vietnam is pleased with the progress made in its efforts to overcome the EC's recommendations. These are not countermeasures and Viet Nam will continue to strive to ensure the sustainable development of fisheries in the future”. The Deputy Minister added:

"Recently, Vietnam has sent high-level delegation with representatives from many ministries and sectors, of which the Minister of MARD is head of delegation to work directly with the EC. However, looking directly at the reality, Vietnam is also facing many difficulties and need to have a roadmap to handle problems for achieving the desired goals of the EC".

"Sea is immense, there are tens of thousands of vessels with tens of thousands of fishermen, it is not easy to do well in a short time. In addition, the control of the ports has many issues to draw experience to ensure traceability of goods. In addition, the coordination between sectors from information sharing to action, especially the coordination on the sea is still difficult. Vietnam is still poor, wishing to equip modern equipment to control the voyage of fishing vessels. However, the investment is not much, not all vessels have positioning equipment", the Deputy Minister analyzed.

The EU appreciated Vietnam's efforts to combat IUU fishing

On the days from 28/10 to 02/11/2018, Members of the European Parliament's Committee on Fisheries (MEPs) came to consider Vietnam's efforts to combat illegal, unreported and unregulated fishing (IUU fishing). The seven-member delegation was led by Spanish MP, Mato Gabriel, spokesman for the Committee on Fisheries.

The delegation held a high-level meeting with the Vietnamese Prime Minister, ministers, vice chairmen of the National Assembly, members of the National Assembly and relevant Vietnamese officials. Then, conduct meetings, meet and review in Hanoi and some coastal provinces of Vietnam. MEPs highly appreciated Vietnam's efforts in implementing measures to implement and pass the new legislation. In particular, the delegation introduced a press release in the European media, praising Vietnam's efforts to combat IUU fishing.

After meeting and working with Vietnam Association of Seafood Exporters and Producers (VASEP), Binh Dinh Seafood Joint Stock Company (BIDIFISCO), and Binh Dinh Tuna Association, directly listen to information on the challenges and constraints of the Vietnamese fisheries and aquaculture sector, the mission appreciated the open, frank and constructive exchanges of relevant authorities and fisheries organizations of Vietnam. Accordingly, some improvements in the Fisheries Law of 2017 will definitely increase the ability to tackle and prevent IUU fishing. The delegation praised VASEP for releasing "*White Book on Combating IUU fishing in Vietnam*" as the book conveyed the message of Vietnam's efforts to solve the "yellow card". At the same time, there is a shift in the perception and actions of regulators and the direct implementation of regulations on IUU fishing.

MEPs visited and witnessed the new infrastructure of the Fisheries Monitoring Center in Hanoi and the new infrastructure at Quy Nhon, Hai Phong. Accordingly, monitoring, monitoring and control could have a positive impact on preventing IUU fishing. The mission also addresses the challenges that Vietnam faces such as overcapacity and abuse.

Vietnam's processing industry is growing so fast, demand for raw materials is increasing; While the legal and regulatory framework and management of Vietnam is weak, Vietnamese fishermen tend to be in violation of foreign waters. In this regard, the mission acknowledged the political efforts of Vietnam in its commitment to address the issues of IUU fishing. At the same time, stressed that Viet Nam has devoted sufficient human and financial resources to do this.

The mission has identified the importance of the EU-Vietnam Free Trade Agreement (EVFTA), emphasizing the need to clarify the cooperation between the two sides in the fight against IUU fishing in the Trade Development Program the Sustainability of the EVFTA Agreement. The delegation pointed out that it is important for Vietnam and the EU to continue open dialogue and work together to build solutions to successfully tackle global challenges and fight against IUU.

The legal framework of the Fisheries Law of Vietnam 2017 and the implementation of the current regulations are in the right direction. Therefore, the delegation encouraged Vietnam to continue on this path.

4.1.5 Application of advanced technology in aquaculture

In the world, technology 4.0 has been promoted in the agricultural and fishery sector in countries such as Israel, America, Europe, Japan, Korea, Taiwan (China), Thailand and creates outstanding value in production such as labor liberation, risk reduction in production, cost savings, product traceability, rapid sensor to adapt with changes of weather and environment. In Vietnam, 4.0 technology has been researched, applied and promoted in recent years and creates significant value for the cultivation, husbandry and fisheries sectors. However, at present, the application of technology in Vietnam with the actual rate is not high and still fragmented. Many aquaculture farmers also refuse to use high technology because of high capital investment. Therefore, in the coming time, it is necessary to strengthen the activities of encouraging, consulting and supporting enterprises and aquaculturists to change their production methods, application of techniques and high technology, minimize losses during farming as well as increase quality better and better.

Foremost, Vietnam needs to improve the water quality. At present, the quality of water supply for aquaculture activities is severely reduced compared to previous years, directly affecting the farmed species. To ensure the quality of aquaculture, it is necessary to improve the quality of the water environment. Aquaculture farmers need to apply some technology in water treatment such as biological filter technology, biofloc technology to improve water quality. For state agencies, it is necessary to continue to strengthen the inspection and control and organize the community management and supervision to manage the environment and apply strict sanctions to production units who fails to comply with the provisions of the Law on Environmental Protection in order to minimize the arbitrary discharge of production units.

4.1.6 The advantages and disadvantages of seafood export

Seafood is one of the key export items of Vietnam. In 2018, MARD set a target of 8.5 billion USD for seafood exports. According to many experts, this goal is not out of reach. Looking back to 2017, seafood export results of Vietnam exceeded the expectations of both regulatory authorities and exporters themselves, over 8.3 billion USD, up 18.7% over 2016; especially shrimp has increased by 21% with turnover reached over 3.8 billion USD, accounting for 46% of the fisheries sector. According to D-Fish, the demand for shrimp products in the world is huge. Shrimp is one of the products that are considered its supply always lower than demand. According to forecasts of some international organizations, by 2020 in the absence of disease, natural disasters and with the current rate of development, the world shrimp supply may be short of over 2 million tons. Potential to develop shrimp industry is very great. The problem of Vietnam is the policy response to developing shrimp for potential matching. However, over the last time, shrimp farmers are always lack of capital and process of shrimp export also encountered many obstacles and barriers. At present, seafood-processing enterprises have to depend on many sub-licenses and tolerate 5-7 inspections per year.

In order to exploit the potential and strength of shrimp, in February 2017, the Prime Minister chaired the Vietnam Shrimp Industry Development Conference directed Vietnam to become a big shrimp farm of the world, in which the Mekong River Delta is the capital of farming and processing high quality shrimp. Many global brands on shrimp need to be built. Shrimp industry should be a typical example in taking off, catching up on the way of building modern agriculture with high added value; became the world's bright spot for applying the results of the 4th Industrial Revolution, applying biotechnology, automation, electronics, and informatics in the production of breeds, feeds, shrimp farming and processing. By 2025 export turnover of shrimp is to strive to

reach 10 billion USD. According to experts, in order to achieve this goal, the agriculture sector must strive more to solve challenges such as developing a strategy for the shrimp industry development, solving labor resources in fisheries sector and dealing with epidemics, breeding initiative, and building value chain.

Meanwhile, the EU has not yet officially decided to remove “yellow card” (warning from the end of 2017) for Vietnamese capture fisheries. According to the Ministry of Agriculture and Rural Development, Vietnam has implemented drastic measures to remove “yellow card”, the number of fishing vessels and fishermen illegally fishing abroad markedly reduced, there is almost no fishing vessels illegal fishing in the Pacific Islands. Viet Nam has also stepped up the traceability of seafood in accordance with regulations. Businesses also committed to procure only seafood materials of clear origin from legal fishing vessels. At the same time, only seafood that is legally harvested is imported, seafood from illegal fishing vessels without a fishing license is not purchased.

According to experts, the potential to develop fisheries is very great. In order to export sustainably, in addition to building a rational strategy, the fisheries sector should guide and support aquacultural rearing, purchasing and pre-processing units to apply production processes and advanced quality management programs to ensure food safety; Assist seafood processing enterprises to connect and build fisheries raw material areas to meet the requirements of the import market and trace their origin to meet the advanced import standards of the world.

For market development and trade promotion, Vietnam should continue to effectively carry out trade promotion activities to strengthen and develop traditional markets, major markets (EU, Japan) and expand markets in Eastern Europe, the Middle East, China, South Korea. At the same time, to develop and expand the domestic market for tourism, urban areas and large residential areas. Strengthening trade promotion activities for fisheries products in key markets (exhibitions, fairs, propaganda and advertisement); to build up the brand name and quality standards for a number of key fisheries products for export, meeting the requirements on quality, design and specifications of fisheries products of importing countries.

4.2 The implementation towards Sustainable development

4.2.1 Legally

In order to create a comprehensive legal framework for social relations in the fisheries sector towards sustainable fisheries development, on November 26, 2003, the National Assembly of Vietnam adopted Fisheries Law 2003. The Fisheries Law 2003 came into force on 1 July 2004.

In practice, the Law on Fisheries 2003 and the sub-law documents has come into force. Organizations, individuals, households and communities are encouraged to participate in aquaculture, exploitation, protection and development of fisheries resources, promote production and business and improve the competitiveness of seafood enterprise; To create jobs, raise incomes, improve the livelihoods of fishermen, and develop the country's economy in the course of transition to a market oriented economy and international economic integration. As a result, Vietnam's seafood sector has achieved remarkable results. The value of export turnover has increased approximately fourfold - from 2.2 billion USD in 2003 to 8.3 billion USD in 2017.

The fisheries sector has been developing strongly and is determined to become a commodity-based production sector, highly competitive brand in international economic integration, on the basis of promoting the advantages of a productive, renewable resources exploiting sector with advantages of tropical fisheries; It gradually shifted from the personal fishery to the modern, controlled and responsible fishery in order to create a synchronous development and contribute to the great development of the socio-economic development.

However, Vietnamese fisheries sector is in the context of complex and unpredictable climate change. Fisheries resources have been declining; the habitats of aquatic species are at risk of serious pollution; Fisheries development is not effective and unsustainable. In addition, there are a number of other major challenges for the fisheries sector such as requirements of international integration; The capacity, experience in management and equipment for inspection and control of fishery activities is limited; Trends in trade protection, and technical barriers of importing countries.

After 13 years of implementation of the Fisheries Law 2003, the requirements for research, amendment are as follows: Some of the provisions of the Fisheries Law 2003, when implemented, have shown limited and inadequate measures to catch up with the rapid development of Vietnam's fisheries sector - especially the regulations on management planning and development of aquatic resources; investigation and study of aquatic resources; management of aquaculture activities;

management of activities of releasing aquatic resources; Management of fishing license; registering fishing vessels; Fisheries surveillance. Moreover, some new provisions of the International Conventions on Fisheries require the amendment of the Fisheries Law 2003 as appropriate (such as the Agreement on Port State Measures; regulations on illegal, unreported, unregulated fishing). In addition, there are requirements for administrative reform, socialization of public services, simplification of administrative procedures, decentralization to the local level, and simplification of investment conditions. Some of the provisions of the Fisheries Law 2003 do not even conform to the new laws passed by the National Assembly in relation to the fisheries sector (for example, the Investment Law, Enterprise Law, Land Law). Therefore, overcoming the shortcomings mentioned above is very necessary.

In 2017, in order to meet the requirements of international integration and requirements in administrative reform, environmental protection and adaptation to climate change, on 21/11/2017, the National Assembly of Vietnam adopted Fisheries Law 2017, replacing the Fisheries Law 2003. Fisheries Law 2017 is effective from 1 January 2019.

Accordingly, the Fisheries Law of 2017 was set up with the objective of establishing a legal framework to regulate social relations in the fisheries sector in order to raise incomes and improve the lives of fishermen, for sustainable and responsible aquaculture development; to respond to climate change and contribute to the protection of national sovereignty over the sea.

The Fisheries Law of 2017 was developed on the basis of an ecosystem approach and has many new contents compared to the Fisheries Law 2003, such as extending the scope of application for both Vietnamese organizations and individuals currently fishing in the waters of Vietnam. In addition, the Fisheries Law of 2017 supplemented the regulations on Co-management in fisheries resources protection; Marine protection areas (MPA); Fund for protection and development of aquatic resources (with 3 types: Central Fund, Provincial Fund and Community Fund); The registration of aquaculture of key aquatic species; Licensing aquaculture at sea; Quota allocation in aquatic resource exploitation; socializing the registration of fishing vessels; regulations on fisheries surveillance (there are two types: fisheries surveillance at central and fisheries surveillance of coastal provinces/cities); Provisions of domestication of international law; and especially the raising of sanctioning levels for administrative violations in the fishery field. (*The terms are explained in details in Appendix 1*)

The Fisheries Law of 2017 has institutionalized the policy, guidelines and reform policy of the Party on fisheries; in line with the development strategy of the fisheries sector with development along the value chain, raising added value, promoting the fisheries sector to become a spearhead economic branch in sustainable development.

The Fisheries Law of 2017 was established to meet the needs of development, deepening the integration of the fisheries sector, in line with the international treaties that Vietnam has signed or acceded to.

Table 18: Prohibited acts according to Fisheries Law 2017 towards sustainable fisheries development

Destroying aquatic resources, aquatic ecosystems, reproductive areas, aquatic habitats of fingerlings and marine species
Obstructing the natural migration routes of aquatic species
Encroaching, occupying or damaging the aquatic resource protection zones and marine protection areas (MPA)
Activities (fishing, aquaculture, construction) affect the habitat and aquatic resources in the strictly protected zone and the ecological restoration zone of the MPA
Fishing vessels, seagoing vessels and other navigational means operating illegally within the MPA strictly protected subdivision - except for force majeure events
Illegal, unreported, unregulated fishing (IUU fishing); Purchasing, selling, transporting, stockpiling, preliminarily processing, processing the illegal fishery and fishery with impurities
Use of substances, banned chemicals, toxins, explosives, electric impulses, electric currents, methods, means and fishing gears that are destructive to exploit aquatic resources
Use of fishing gear to interfere with or cause damage to organizations/individuals engaged in fishing; Anchoring and mooring at the place where fishing gear of organizations/ individuals are operating or where other fishing vessels are operating - except in force majeure cases
Dispose of fishing gear in natural waters - except in cases of force majeure
Introducing impurities into fisheries for the purpose of commercial fraud
Using antibiotics, veterinary drugs, plant protection drugs banned in aquaculture; Chemicals, probiotics and microorganisms banned from use in the production of aquatic feeds and products for environmental treatment of aquaculture; Using aquatic species outside the list of aquatic species permitted for trading in Vietnam for aquaculture
Destroying, dismantling, damaging, encroaching on the scope of works of fishing ports and storm

shelters for fishing vessels; Discharging wastes not at the prescribed places in fishing port areas or storm-sheltered areas for fishing vessels
Taking advantage of the investigation and assessment of fisheries resources to affect national defense, security, national interests, legitimate rights and interests of other organizations/individuals; Supplying and exploiting information and using data and information on fisheries resources in contravention of law
Source: MARD, 2018

4.2.2 Policy

In order to develop sustainable fisheries, the State will prioritize the activities of research, investigation, assessment, protection and rehabilitation of aquatic resources and rehabilitation of aquatic ecosystems; To keep the original varieties of indigenous aquatic species of economic value, endangered, precious and rare aquatic species; Construction of grade I, grade II ports, storm shelters for fishing vessels; Essential infrastructure of MPA; Infrastructure of concentrated aquaculture areas, concentrated aquatic breed production areas; Develop a system for monitoring and supervising the operation of fishing vessels at sea; Information system, national database on fisheries; Monitoring system, environment and disease warning system in aquaculture.

In each period and based on capacity of the budget, the State will prioritize support for the activities such as Development of science and technology, with priority given to high technologies, advanced technologies and new technologies in the field of aquatic breeding; Producing national aquatic products, major aquatic products; Production of aquatic feeds, products for aquatic environmental treatment; Technology of processing by-product into food or as raw materials for other industries; Development of human resources, vocational training in fisheries; Implementing co-management in fisheries resources protection; Building a major fisheries center; Buying on the sea and island aquaculture insurance; Insurance for crew members; Hull insurance, equipment for fishing vessels operating on the sea from offshore areas.

In addition, developing fishery activities from offshore areas; Recovering production in case of environmental incidents, natural calamities or epidemics; Assisting fishermen in the time of banning fishing and changing their occupations in order to reduce the fishing capacity of inshore fisheries; Building national product brand, promoting trade, developing markets for seafood products.

Furthermore, **organizations and individuals inside and outside the country are encouraged to invest in** Production organization based on value chain, linkage, cooperation; Investing in advanced

technology in fishery processing to enhance added value of products, reduce post-harvest losses; Building fishery wholesale markets, promoting the brand of fishery products; Investment in aquaculture on the sea; Organic aquaculture; and Applying quality management systems in fisheries production and trading; Traceability of seafood.

4.3 The results

4.3.1 Vietnamese fisheries sector towards sustainable development

Restructuring the fisheries sector has created a shift in the right direction in the sector structure and product structure. Currently, the value of aquaculture production in the total value of agriculture-forestry-fishery increased 2.5% compared to 2012; the average growth rate of fishery production in the period 2013-2017 is 4% per year. Income growth from fishery was 4.3% per year.

Fisheries sector has exceeded the target - The total output of aquatic products will reach 6.5-7.0 million tons by 2020 (according to the Decision No. 1690/QD-TTg of the Prime Minister dated 16 September 2010 on approval Strategy for development of Vietnam's aquatic products to 2020). Total fish production will increase from 5.9 million tons in 2012 to 7.2 million tons in 2017. Thus, over the target of 03 years with total output exceeds about 0.5 million tons, equivalent to about 7.4% over the plan in 2020. At the same time, achieved some results related to the shift between fishing and aquaculture.

In the field of aquaculture, the proportion of key products and diversification of species has been increased. In the field of exploitation, the fleet structure has shifted sharply, in the direction of reducing the number of small-capacity fishing boats operating on the shore, increasing the capacity of vessels over 90CV to exploit offshore. There are 12,000 fishing vessels managed by cruise control using a navigation system installed on board, connected to shore stations, which account for nearly 40% of all offshore fishing vessels. The localities have built 925 fishing vessels according to Decree 67. Each year, about 24 thousand vessels participate in activities in remote waters, contributing to the protection of sea island sovereignty.

Regarding the restoration and protection of fishery resources, in April, the Marine Research Institute completed the report on marine fisheries survey results in Vietnam's seas for the period 2011-2015. This result will be the basis for the planning, management, protection and development of fisheries resources, sustainable development of fisheries. Specifically: There will be plans to exploit in each sea area, applicable to each type of occupation; approach to forecast short-term

fishery (10 days), durations, durations. Established a network of 10/16 MPAs, planning 6/45 national inland water conservation zones. In addition, the reorganization of the fishery logistic system, marine production following the collective economy model for offshore exploitation and the co-management model for coastal waters, Pepper: Improve harvesting efficiency and reduce postharvest losses. Thanks to the investment in marine and port logistical services, the post-harvest losses for capture fisheries are on the downward trend.

As of 2017, there are 636 seafood-processing enterprises in the whole country (accounting for nearly 50% of seafood processing establishments registered for production and business). In particular, it is concentrated in the Mekong River delta. The level of processing technology and food hygiene and safety is increasingly invested to meet the requirements of the market in the world. As a result, the seafood export turnover has continuously increased over the years. Based on the planning of the fishing port system and the storm shelter site approved by the Prime Minister, 82 fishing ports have been invested and put into operation in 27 coastal provinces and cities. The total number of storm shelters in the country is 89 with the total capacity of over 42,400 fishing ships. With the implementation, positive changes and results achieved, the fisheries sector continues to pursue the goal of sustainable development, security and national defense in the sea - island areas of Vietnam.

4.3.2 Overcoming the inadequacies

It is clearly that Vietnam fisheries sector has been developing strongly. It is determined to become a commodity production sector with a highly competitive brand in international economic integration on the basis of promoting the tropical fisheries with the advantages of a renewable resources exploiting sector. It gradually shifts from the personal fishery to the modern one controlled and responsible in order to create a synchronous development and contribute to the socio-economic development of Vietnam.

Nevertheless, Vietnam fisheries sector is developing unsustainably. In the field of aquaculture, there are four groups of problems that affect the sustainable development, including the economic group; society group; environment group; and policy group. Details are as follows: **Firstly,** in the Economic group: Market is volatility; Sustainability in aquaculture planning is poor, the farming system is not economically efficient and not environmentally friendly while there are increasing demands for products which are environmentally friendly (produced through the adoption of environmentally sustainable practices). **Secondly,** in the Social group: Lack of combination of resources managers and users; Drugs and chemicals are not used properly; Income gap in

aquaculture is high; Guidelines on land use and land using rights remain inadequate. **Thirdly,** in the Environment group: Investment in infrastructure is poor, irrigation has not been integrated for aquaculture with activities of other sectors; Aquaculture is dependent on nature and more and more decreases in productivity; Broodstock depends on the exploitation in the wild and the yield is more and more reduced; Poor fisheries fingerling quality, high mortality; Environmental and ecological degradation greatly affects the development of aquaculture; Research investment is limited; The quality of feed used for aquaculture is low, high cost, largely dependent on the source of trash fish; Aquaculture on sand increases salinity intrusion; Invasion of new species can increase the risk of disease spread and ecological imbalance. **Finally,** within the Policy Group: Lack of coordination and cooperation between state management agencies, scientific researchers, enterprises, and manufacturers; Lack of integration of sustainable development issues in planning and management.

To improve productivity and yield of aquaculture, step by step overcome the limitations in farming, the State will base on capacity of the budget of each period to prioritize support for the activities, the State will prioritize support for the activities such as Development of science and technology, with priority given to high technologies, advanced technologies and new technologies in the field of aquatic breeding; Producing national aquatic products, major aquatic products; Production of aquatic feeds, products for aquatic environmental treatment… Organizations and individuals inside and outside the country are encouraged to invest in Production organization based on value chain, linkage, cooperation; Investment in aquaculture on the sea; Organic aquaculture; and Applying quality management systems in fisheries production and trading.

Similarly, in the field of capture fisheries, there are also problems that affect the sustainable development. In April 2018, after RIMF announced the results of survey and assessment of fisheries resources and habitats of aquatic species, the combination of the survey result with the fact of catching in seawaters of Vietnam in recent years has shown that aquatic resources are being over-exploited. So, the management of capture fisheries under quotas to ensure sustainable capture fisheries on the basis of aquatic resources available in Vietnamese waters need be implemented as soon as possible. Because the over-exploitation exists in many sea areas of Vietnam, especially in the Central Coast area and the South West area, threatening seriously to the marine resources.

Regarding to activities of catching and protecting aquatic resources, Co-management in aquatic resources conservation is exactly a new bright spot in the provisions of Fisheries Law 2017 (not like Fisheries Law 2003 only regulates the direction of community-based fisheries management). Accordingly, individuals/households, when meeting the conditions set by the State, will be given

the right to manage and protect fishery resources. The conditions are individuals/households must live and benefit from fisheries resources in the area designated by the State for co-management; must register to participate in co-management in a defined geographic area. At that time, individuals/households become members of the community organization, recognized by the state and assigned co-management and protection of fisheries resources.

This regulation aims to raise awareness and responsibility of people in fisheries resource protection, step by step implement the policy of socialization, strengthen the role and responsibility of the community in management and protection of fisheries resources. As a result, implementation of co-management is an effective solution to reduce conflicts of interest in the community, contributing to the sustainable use of fisheries resources. Therefore, the implementation of co-management will promote Vietnam fisheries develop more sustainably and responsibly.

CHAPTER 5. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

Based on the literary review, I identified that the theory of "sustainable development" is suitable for my thesis. The theory says that "sustainable development" is the development that meets the needs of the present generation as well as the needs of future generations. The concept of "sustainable development" also expresses concern about environmental issues in relation to socio-economic issues. The concept of "sustainable fisheries development" is to refer to development of fisheries activities that bring human welfare and social acceptance, effectively use natural resources, and protect ecological environment.

As an answer to the first research question, the fisheries sector of Vietnam is a renewable resources exploiting sector with advantages of tropical fisheries and many other advantages (such as a coastline of 3260 km; about 3000 islands; over 3000 rivers and lakes; and rich aquatic resources). However, it has been developing unsustainably. In the field of marine capture fisheries, the over-exploitation has happened in some seawater of the Central Coast area and the South West area, depleting the aquatic resources and breaking the ecological balance. In addition, the fisheries sector even received the "yellow card" warning of the European Union in October of 2017. In the field of aquaculture, there were also many problems - Water pollution from industrial and urban waste; using trash fish as fishery feed has caused environmental pollution; over-harvest of wild seed that has depleted seed stocks; poor management of groundwater that has limited fresh water of household consumption and agricultural activities. Besides, seafood processing and trading have faced many challenges from commercial policies and technology barriers of import countries.

In order to overcome the weaknesses, the issue of sustainable fisheries development became the required rules in Fisheries Law 2017. Accordingly, to answer the second research question, "co-management" is the best approach to exploit sustainably and protect effectively aquatic resources through sharing management rights of the State to fishermen, strengthening the role and responsibility of the community in management and protection of fisheries resources. Fisheries Law 2017 also regulated on combating "IUU-fishing" (illegal, unreported, unregulated fishing). In the short term, Vietnam should immediately implement 09 recommendations of the EC to overcome the EU's "yellow card" as soon as possible. At the same time, Vietnam should see the "yellow card" as a driving force for the modernization of the fisheries sector, enhancing its competitiveness compared to other countries in the region, changing the fisheries industry towards sustainable and responsible development.

5.2 Recommendations

How Vietnam can overcome the difficulties and obstacles. Vietnam fisheries sector is in the context of complex and unpredictable climate change. Fisheries resources have been declining; the habitats of aquatic species are at risk of serious pollution; Fisheries development is not effective and unsustainable. In addition, there are a number of other major challenges for the fisheries sector such as requirements of international integration; the capacity, experience in management and equipment for inspection and control of fishery activities is limited; Trends in trade protection, technical barriers of importing countries.

For the fisheries sector to continue to develop in the direction of sustainable way, in the coming time, many synchronous solutions are required to implement to help Vietnam **to build fisheries sector sustainable, responsible and compliant with international regulations**. Legal and policy solutions have been clearly articulated in Section 4.2 of the implementing towards sustainable development. In addition, State management agencies and functional units should be continuous to discuss, **seek concrete solutions to the existing problems in the aquaculture sector** related to the economic, social and environmental aspects as mentioned above.

For sustainable development of marine capture fisheries, Vietnam needs **to closely control fishing quotas of 11 provinces** - including 09 provinces in the Central Coast area (Quang Tri, Thua Thien Hue, Da Nang, Quang Nam, Quang Ngai, Binh Dinh, Phu Yen, Khanh Hoa, and Ninh Thuan) and 02 provinces in the South West area (Ca Mau and Kien Giang); Strengthening propaganda on **Co-management in aquatic resources conservation** for people to raise awareness, actively participate in local co-management.

Towards sustainable fisheries development, Vietnam should implement nine recommendations of EC to overcome “yellow card”. Accordingly, Vietnam needs focus on **implementing synchronously and decisively the actions under the 9 recommendations of EC**; Taken initiative in building a sustainable fishery, a responsible fishery and adhering to international regulations; **Strengthen the state management**, improve the system of state management of fisheries from central to local levels; Continue to promote administrative reform in the fisheries sector; Perfect the system of standards, technical regulations, processes and conditions in the fields of fisheries production and trading, which shall serve as a basis for management and socialization of a number of stages in the state management of fisheries; Scaling up the models of state management with the participation of the community, encouraging models of cooperation and linkage in production,

processing, trading and consumption, especially between processing enterprises and producers of raw materials; and Strengthen the effective coordination between the state and professional social organizations.

Vietnam must strictly abide by the regulations on fishing. In order to ensure a good source of raw materials for fisheries production, organizations and individuals involved in fishing must comply with the Vietnam Fisheries Law 2017, especially not to offend foreign waters, not to catch prohibited aquatic species. Authorities need to strictly deal with violations of fishing regulations as well as manage well fishing activities to ensure that fisheries resources are not depleted by gradually reducing trawlers, re-organizing the exploitation of offshore and coastal areas based on the model of exploitation by teams, groups and the model of co-management.

Overall, the recommendations based on my study are that Vietnam fisheries sector should propagandize and raise managers and fishermen's awareness in the implementation of the Fisheries Law of 2017, especially co-management in the protection of fisheries resources, combating "IUU fishing", and priority development policies in the fisheries activities. Furthermore, the fisheries sector should manage the exploitation according to quotas based on the results of the survey of fisheries resources 2011-2015.

5.3 Limitations and future research

5.3.1 Limitations

There were some limitations in my research. The main reason was lack of time. Furthermore, the scope of the Master's program did not meet this requirement, either. Specifically, I focused on studying fishing and aquaculture much more than the other fisheries activities. I did not use indicators to evaluate all fisheries production and trading activities, but rather focuses on two production activities that much involve two sets of sustainable development indicators for capture fisheries and aquaculture. The reason is that assessing and determining the levels of sustainable development of all fisheries production and trading activities (such as fishing, aquaculture, processing, export, and trade promotion) ask a lot of time and study effort, while the scope of the Master's program does not meet this requirement.

Moreover, in the world as well as in Vietnam, it is the fact that scientific/scholarly materials relating to the issue of “sustainable development in fisheries sector” often much refer to capture fisheries and aquaculture activities. For example, “Indicators for Sustainable Development of Marine

Capture Fisheries" (FAO, 1999); "The FAO Guidelines for the Sustainable Development of Fisheries Capture and Fisheries in Australia" (FAO, 2000); and two sets of indicators assessing the sustainable development in the field of capture fisheries and aquaculture in Vietnam (VIFEP, 2006).

Bringing these theories into practice in Vietnam will not only help identify the current status of the fisheries sector in the areas of capture fisheries and aquaculture, but also determines the level of sustainable development of these two activities. However, as the research does not cover the whole range of activities of the fisheries sector, the identification on sustainable development will be limited and not comprehensive. The assessment and determination of the level of sustainable development are mainly in two areas of capture fisheries and aquaculture. Likewise, the search for solutions mainly lies in these two areas. In addition, in the process of research and assessment of the sustainable development of the capture fisheries and aquaculture sector, despite the use of indicators for monitoring and evaluation of sustainable development, due to limited knowledge and profession, the student of the Master in Public Policy and Finance Management program is not able to explore and solve the problems thoroughly.

5.3.2 Future research

In the future, I will continue to study and evaluate the fisheries production and trading activities of Vietnam; determine the levels of sustainable development based on the sets of indicators set up by Vietnam and/or other countries around the world. In this way, the views on sustainable development in fisheries production and business in Vietnam will be more comprehensive and accurate, helping the Government of Vietnam more effectively in making policies and strategies for sustainable fisheries development.

REFERENCES

Books, magazines

D-Fish. (2014). *Some decisions on fisheries development until 2020, vision 2030*. Hanoi: Agricultural Publishing House.

GSO. (2018). *Statistical Yearbook 2017*. Hanoi: Statistical Publishing House.

MARD. (2014). *Developing domestic market for seafood*. Hanoi: Agricultural Publishing House.

MARD. (2016). *Statistical Yearbook of Agriculture and Rural development 2015*. Hanoi: Agricultural Publishing House.

MOFI. (2007). *Vietnam Aquaculture - Status and Solutions for Sustainable development*. Hanoi: Agricultural Publishing House.

MPI. (2010). *The fisheries sector in Vietnam: A strategic economic analysis*. Hanoi: Statistical Publishing House.

MPI & UNDP. (2011). *Review of 5 years of implementation of strategic orientation for sustainable development in Vietnam*. Hanoi: Encyclopedia publisher.

Ngo, A. T. (2014). *50 years of Vietnam fisheries.* Hanoi: Agricultural Publishing House.

Ngo, A. T. (2015). *Fisheries economics - A long way*. Hanoi: Agricultural Publishing House.

Nguyen, T. T. (2008). *International cooperation and integration to develop*. Hanoi: Agricultural Publishing House.

Pham, A. T. (2012). *Legal documents on management of aquaculture*. Hanoi: Agricultural Publishing House.

VASEP. (2008). *Vietnam fisheries export statistics 1998-2007*. Hanoi: Agricultural Publishing House.

VIFEP. (2015). *Vietnam fisheries towards a more quality and sustainable development*. Hanoi: Agricultural Publishing House.

Vu, V.T. (2018). *Vietnam Fisheries Law 2017 - The main contents.* Hanoi: Labor Publishing House.

Reports; documents and papers of seminars, workshops, conferences, meetings, and forums

Cao, L.Q. (2006). Report on Indicators of Sustainable aquaculture development in Vietnam.

D-Fish. (2012). Indicators to monitor and assess the Implementation of Development strategy of Vietnam fisheries up to 2020.

FICen. (2014). Vietnam fisheries: Integration and development.

GSO & MPI. (2017). Strategic Plan for Agricultural and Rural Statistics in Vietnam (SPARS).

MARD. (2014). Trade promotion for sustainable fisheries development in Central Coast.

MOFI. (2003). Indicators of Sustainable aquaculture development in coastal areas of Vietnam.

MOFI & IUCN. (2006). Sustainable development in Vietnam Fisheries: Issues and Approaches.

MONRE. (2010). Conservation of nature and culture for the sustainable development of the Mekong Delta.

Nguyen, M.D. (2010). Report on Background study for Global value chain analysis for striped catfish.

Nguyen, M.D. (2011). Report on Value chain analysis in Vietnam.

Nguyen, T.A. (2006). Report on Indicators of Sustainable development in Vietnam fisheries.

Nhu, V.C. (2013). Report on VietGAP - An approach on Sustainable aquaculture development in Vietnam.

OECD. (1997). Towards Sustainable Fisheries.

OECD. (2000). Transition to Responsible Fisheries.

OECD. (2002). Fisheries Sustainability Indicators: The OECD experience.

Pham, A.T. (2013). Report on Positioning Vietnam aquaculture towards sustainability.

Pham, T.Y. (2013). Report on Vietnam Fisheries Development.

UN. (2012). The Future We Want.

UNEP. (2009). Certification and Sustainable Fisheries.

UNEP. (2011). Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication.

UNEP. (2013). Fisheries and Aquaculture.

UNGA. (2012). Sustainable Fisheries.

VASEP. (2015). Current policy framework and impacts on pangasius supply chain.

VIFEP. (2002). Indicators to assess Sustainability of Aquaculture in Coastal areas of Vietnam.

VIFEP. (2006). Indicators of Sustainable aquaculture development in Vietnam.

World Fish Center. (2008). Strategies and Options for Increasing and Sustaining Fisheries and Aquaculture Production to Benefit Poorer Households in Asia.

Online texts

FAO. (1999). *Indicators for sustainable development of marine capture fisheries*. Retrieved from http://www.fao.org/3/a-x3307e.html

FAO. (2010). *Aquatic Biosecurity: A Key for Sustainable Aquaculture Development*. Retrieved from http://www.fao.org/docrep/meeting/019/k7580e.pdf

FAO. (2017). *FAO Global Capture Production database updated to 2015 - Summary information*. Retrieved from www.fao.org/fishery/statistics/en; http://www.fao.org/3/a-br186e.pdf

FAO. (2017). *An Overview of Recently Published Global Aquaculture Statistics*. Retrieved from http://www.fao.org/3/a-i7171e.pdf

Gordon, M. (1996). *Problems and fundamentals of sustainable development indicators*. Retrieved from https://www.researchgate.net/publication/227651004_Problems_and_Fundamentals_of_Sustainable_Development_Indicators

Hopwood, B. (2005). *Sustainable Development: Mapping Different Approaches*. Retrieved from www.interscience.wiley.com DOI: 10.1002/sd.244

IUCN. Retrieved from https://portals.iucn.org/

MARD. (2018). *Statistical Report - September 2018*. Retrieved from https://www.mard.gov.vn/ThongKe/Lists/BaoCaoThongKe/Attachments/141/Baocao_T09_2018.pdf; and https://www.mard.gov.vn/ThongKe/Lists/BaoCaoThongKe/Attachments/141/Phuluc_T9_2018.pdf

MARD. (2017). *Statistical Report - December 2017*. Retrieved from https://www.mard.gov.vn/ThongKe/Lists/BaoCaoThongKe/Attachments/132/Baocao_T12_2017.pdf; and https://www.mard.gov.vn/ThongKe/Lists/BaoCaoThongKe/Attachments/132/Phuluc_T12_2017.pdf

MARD. (2016). *Statistical Report - December 2016*. Retrieved from https://www.mard.gov.vn/ThongKe/Lists/BaoCaoThongKe/Attachments/120/Baocao_T12_2016.pdf; and https://www.mard.gov.vn/ThongKe/Lists/BaoCaoThongKe/Attachments/120/Phuluc_T12_2016.pdf

MARD. (2015). *Statistical Report - December 2015*. Retrieved from https://www.mard.gov.vn/ThongKe/Lists/BaoCaoThongKe/Attachments/108/Baocao_T12_2015.pdf; and https://www.mard.gov.vn/ThongKe/Lists/BaoCaoThongKe/Attachments/108/phuluc_T12_2015-f.pdf

MARD. (2014). *Statistical Report - December 2014*. Retrieved from https://www.mard.gov.vn/ThongKe/Lists/BaoCaoThongKe/Attachments/96/Baocao_12_2014.pdf; and https://www.mard.gov.vn/ThongKe/Lists/BaoCaoThongKe/Attachments/96/phuluc_12_2014.pdf

MARD. (2013). *Statistical Report - December 2013*. Retrieved from https://www.mard.gov.vn/ThongKe/Lists/BaoCaoThongKe/Attachments/84/Baocao_12_2013.pdf; and https://www.mard.gov.vn/ThongKe/Lists/BaoCaoThongKe/Attachments/84/Phuluc_12_2013_fi.pdf

MARD. (2012). *Statistical Report - December 2012*. Retrieved from https://www.mard.gov.vn/ThongKe/Lists/BaoCaoThongKe/Attachments/72/baocao_12_2012_f.pdf; and https://www.mard.gov.vn/ThongKe/Lists/BaoCaoThongKe/Attachments/72/Phuluc_12_2012.pdf

MARD. (2011). *Statistical Report - December 2011*. Retrieved from https://www.mard.gov.vn/ThongKe/Lists/BaoCaoThongKe/Attachments/60/Baocao_12_2011_f.pdf ; and https://www.mard.gov.vn/ThongKe/Lists/BaoCaoThongKe/Attachments/60/Phuluc_12_2011_f.pdf

MARD. (2010). *Statistical Report - December 2010*. Retrieved from https://www.mard.gov.vn/ThongKe/Lists/BaoCaoThongKe/Attachments/48/Baocao_T12%20_2010_fc.pdf; and https://www.mard.gov.vn/ThongKe/Lists/BaoCaoThongKe/Attachments/48/Phuluc_T12_2010.pdf

MCD. (2018). *Engagement of key stakeholders in the development of legal documents guiding implementation of Fisheries Law 2017 and sharing local experiences in management, protection, and development of aquatic resources in Vietnam* Retrieved from http://mcdvietnam.org/engagement-of-key-stakeholders-in-the-development-of-legal-documents-guiding-implementation-of-fisheries-law-2017-and-sharing-local-experiences-in-management-protection-and-development-of-aquatic-re/

MOF. (2018). *Solutions for sustainable development of the fisheries sector in Vietnam.* Retrieved from http://tapchitaichinh.vn/tai-chinh-kinh-doanh/tai-chinh-doanh-nghiep/giai-phap-phat-trien-ben-vung-nganh-thuy-san-viet-nam-136466.html

MOFI & WB. (2005). *Vietnam Fisheries and Aquaculture Sector Study.* Retrieved from http://siteresources.worldbank.org/INTVIETNAM/Resources/vn_fisheries-report-final.pdf

MOFI & WB. (2006). *Guidelines for Environmental Management of Aquaculture Investments in Vietnam.* Retrieved from http://documents.worldbank.org/curated/en/791041468320328088/text/375640REVISED01ment0report1Eng1pdf1.txt

MOJ. (2018). *How is sustainable development and environmental protection related?* Retrieved from http://khpl.moj.gov.vn/qt/tintuc/Pages/hoi-dap-phap-luat-bao-ve-moi-truong.aspx?ItemID=39

Ocean & Coastal Management. (2000). *The FAO guidelines for the development and use of indicators for sustainable development of marine capture fisheries and an Australian example of their application.* Retrieved from www.elsevier.com/locate/ocecoaman

OECD. (2011). *Green Growth in Fisheries and Aquaculture Production and Trade*. Retrieved from https://www.oecd.org/tad/fisheries/green-growth-fisheries-aquaculture-production-trade-report.pdf

RIMF. (2018). *The result of the survey on marine resources in Vietnam 2011-2015*. Retrieved from http://www.rimf.org.vn/bantin/chitiet/bao-cao-ket-qua-%C4%91ieu-tra-nguon-loi-hai-san-bien-viet-nam-giai-%C4%91oan-2011-2015

SAIA. (2018). Sustainable Aquarium Industry Association. Retrieved from http://www.saia-online.eu

VASEP. (2018). *White Book on Combating IUU fishing in Vietnam*. Retrieved from http://seafood.vasep.com.vn/sach-trang-en.pdf

VIFEP. (2018). *Towards a sustainable seafood export target*. Retrieved from http://www.vifep.com.vn/tin-tuc/2383/Huong-den-muc-tieu-xuat-khau-thuy-san-ben-vung.html

VIFEP. (2018). *Building sustainable fisheries ahead of market fluctuations*. Retrieved from http://www.vifep.com.vn/tin-tuc/2381/Xay-dung-nghe-ca-ben-vung-truoc-bien-dong-thi-truong.html

Wen, H.L. (2006). *A comparative analysis of sustainable fishery development indicator systems in Australia and Canada*. Retrieved from www.interscience.wiley.com DOI: 10.1002/sd.291

APPENDIX

Appendix 1 - Explanation of terms in accordance with Vietnam Fisheries Law 2017

Aquaculture activities

Include all activities protecting and developing aquatic resources: aquaculture, capture fisheries, processing, purchasing, selling, exporting and importing aquatic products.

Principles of fisheries activities

The exploitation of fisheries resources must be based on the reserve of fisheries resources in association with the protection, regeneration and development of fisheries resources, not exhausting the fisheries resources and not affecting biodiversity; Based on the ecosystem and scientific indicators in fisheries management to ensure sustainable development.

Adaptation to climate change; To actively prevent and combat natural disasters; To ensure safety for people and means of fishery activities; To prevent and combat fisheries epidemics, ensure food safety and protect the environment.

To ensure the sharing of interests and responsibilities of organizations/individuals in benefiting from the exploitation and use of fisheries resources or operating in branches or trades which directly affect the fisheries resources.

To meet the requirements of international integration; To comply with international treaties to which Vietnam is a member.

Aquatic resources

Are biological resources in natural water having economic, scientific, tourism or recreational value.

Possession of fisheries resources

Fisheries resources belong to the whole people. The state represents the owner and conduct unified management.

Organizations/individuals have the right to exploit fisheries resources in accordance with the law.

Aquatic resource restoration

Is a process of self-recovery or activities of rehabilitating and increasing aquatic resources.

Co-management

Is a management mode in which the State shares its power and responsibilities with community organizations involved in the management and protection of aquatic resources.

Community organization

Is an organization of which members voluntarily participate in, jointly manage, share benefits and protect aquatic resources in geographic areas designated by the State Community organization.

Community organization may or may not have a status of legal entity recognized by the competent State authorities and delegated the right to participate in co-management.

Marine protected area

Is a type of nature reserve, established boundaries on the sea, islands, archipelagoes, sea-coast to protect marine biodiversity.

Endangered, precious and rare aquatic species

Are aquatic species that have a major or even a life cycle in the aquatic environment, have special economic, scientific, medical, ecological, landscape or environmental value and limited quantity in nature or are in danger of extinction.

Native aquatic species

Is aquatic species originating and distributing in the natural environment in a defined geographical area of Vietnam.

Aquatic breeds

Are all species of aquatic animals and aquatic plants (seaweed, alga) used for producing breeds and becoming breeds for aquaculture, including: parents, egg, semen, embryo, larvae, body parts, spore and offspring.

Pure aquatic breeds

Are aquatic breeds having stability in heredity and productivity and the same genotype and phenotype.

Breeding aquatic breeds

Is the culture of aquatic larvae through stages of development and completion of the breeds.

Testing aquatic breeds

Are caring, nurturing and monitoring aquatic breeds under certain conditions and time to determine the distinctness, stability, uniformity of productivity, quality, disease resistance and impact assessment of the breeds being tested.

Inspection of aquatic breeds

Is the inspection and re-evaluation of productivity, quality, disease resistance and characteristics of aquatic breeds.

Food for aquaculture

Is the product providing nutrition, beneficial ingredient for the development of aquatic animals, including: synthetic food, supplements, raw food and seafood ingredients.

Product for aquaculture environment treatment

Is product regulating the physical, chemical and biological characteristics of the environment in favor of aquaculture.

Includes: biological products, microorganisms, chemicals, products for treatment and improvement of aquaculture environment.

Testing food for aquaculture and product for aquaculture environment treatment

Is the process of examining, evaluating and determining the characteristics, benefits and impacts of food for aquaculture, product for aquaculture environment treatment on the culture environment and food safety for aquatic animals.

Marine area for aquaculture

Is the sea area including water, sea floor that has determined boundaries and is used for aquaculture.

Exploitation of aquatic products

Includes: fishing activities and fishing logistics.

Fishing logistics activity

Is the activity of exploring, seeking, leading, delivering aquatic resources caught in natural water areas.

Fishing boat

Is the motorized vessel with or without engine.

Includes: fishing boat for catching and fishing boat for fishing logistics activity

Aquatic service vessel

Is specialized waterway transportation performing official duties in the investigation and assessment of fishery resources; inspecting, patrolling, controlling and supervising fishery activities.

Crew

Is captain, chief engineer, prescribed titleholder who are assigned to work on fishing vessels and aquatic service vessels.

Person working on the vessel

Is a person who is assigned to work on a fishing vessel or aquatic service vessel by the owner of the vessel or captain but not the vessel's crew.

Fishing port

Is a specialized port for fishing vessels, including: the area of fishing port land and area of fishing port water.

Area of fishing port land

Is the limited area to build wharves, warehouses, yards, factories, offices, service facilities, transport systems, communication, electricity, water and other auxilary construction for the operation of fishing port

Area of fishing port water

Is the limited water area to establish water areas in front of the wharves, turning basin, anchorage area, transshipment area, access channel into fishing port and other auxilary facilities.

Trace ability of aquatic products

Is tracking and identifying a unit of aquatic products through each stage of the process of exploitation, aquaculture, processing and trade.

Impurity

Is a substance which is not a natural ingredient of aquatic products.

Regional fishery management organization

Is an organization having responsibility to coordinate, manage and establish measures for the management and conservation of migratory fish stocks and aquatic species in international sea areas.

Appendix 2 - Survey questionnaire

I. Interview introduction

Hello, my name is Le Thi Ngoc Thuy. I working for Fisheries Information Center (FICen) and I am attending a master course in University of Tampere. As a part of my thesis, I am undertaking a study about sustainable fisheries development and what Vietnam need to do in order to lead fisheries sector towards a more sustainable and responsible development. I would like to survey your opinions and attitude about this issue. I would be very grateful if you spend your time answering the questions below:

II. Survey questionnaire (used to ask the farm owners)

Date: _____

Your name: _____

Your address: _____

Age: _____

Sex: _____Male _____Female

1. Aquaculture species are farmed: _____

2. Number of employees: _____Male _____Female

Of which, how many female workers: _____, accounting for (%) _____

3. The average wage paid to the employee by the farm owners (VND/month): _____

4. The highest salaries paid by the owner of the aquaculture farm for employees are (VND/month): _____

5. Number of children aged 6-15 years (children of farm owners and employees): _____

Of which, how many children going to school: _____, accounting for (%)_____

6. Aquaculture experience of farm owners:

_____Under 2 years _____2-5 years _____6-10 years _____ Over 10 years

7. How long is the farm owner allowed to use the land for aquaculture? _____

8. Area:

- Pond area (ha): _____

- Area of water preparation pond (ha): _____

- Mangrove planted area (ha): _____

- Area of pond used for wastewater treatment (ha): _____

9. The distance from the pond near the edge of the sea (m): _____

10. The quality of water supplied to the pond:

_____Good _____Ok _____Not good

If the water quality is okay / not good, what is the specific factor?

- Salinity, specifically: _____

- Dirty, specifically: _____

- Another factor, specifically: _____

_____

11. Investment for one hectare per year (VND): _____

12. Total revenue per hectare per year (VND): _____

13. How many percentages does the cost of pollution treatment (including: treatment of input water, impurity extermination and treatment of aquatic diseases) account for of the total production cost of a crop (%): _____

14. Does treated wastewater meet environmental requirements?

_____Passed _____ Failed _____ Not treated

If Failed/Not treated, indicate the cause: _____

_____

15. Potential for damage by tides, typhoons and floods: _____Able _____Not able

Reason: _____

_____

RECOMMENDATIONS: (Suggestions of the farm owner to improve economic efficiency, environmental protection, sustainable aquaculture in the locality, opinions are arranged in order of priority)

- Priority 1: _____

_____

- Priority 2: _____

_____

- Priority 3: _____

_____

III. Survey questionnaire (used to ask State Organizations such as Fisheries Extension Department, Agriculture Division, and Commune People's Committee)

Date: _____

Your name: _____

Organization: _____

Position: _____

Sex: _____Male _____Female

1. Aquaculture area has been planned or not:

_____ Planed _____ Unplanned

2. In the planned area, the water supply system for the pond has been developed or not:

_____ Developed _____ Not yet developed

If developed, how is the quality of water allocated to aquaculture requirements?

_____ matched, well

There is a problem: _____ quality _____ volume

If there is a problem, then:

Quality problems are _____

_____

_____

3. A system of collecting and treating wastewater has been built or not:

_____ Built _____ Not yet built

If it has been built, the treated wastewater meets environmental protection requirements or not:

_____do meet _____do not meet

If the requirements are not met, then which are the requirements?

_____

_____

4. Does the aquaculture area have a transportation system for aquaculture?

_____Does with total area for traffic (ha) _____

_____Does not

If does, please comment on the quality of the road:

_____ Satisfactory _____ Not Satisfactory

If the requirements are not met, then which are the requirements?

_____

_____

5. Does the aquaculture area have electricity network?

_____Does _____Does not

If you have a power grid, evaluate how often you have electricity:

_____ Frequently _____ Not often

6. Does the aquaculture area contain mangrove vegetation?

_____ Does with total area (ha) _____

_____Does not

If there is still a mangrove vegetation area:

- The area of mangrove plant outside the cultured area (ha) _____

- The area of mangrove plant within the cultured area (ha) _____

SUMMARY AND EVALUATION:

7. At present, total of hectares of aquaculture in the locality (ha) _____

Of which, the area covered by the plan and achieved the above requirements (ha) _____

8. In the area of local aquaculture occurs:

- Conflict between farming households and non-farming households: _____Yes _____No

- Conflicts between the fisheries sector and other local sectors (e.g. Tourism, Agriculture): _____Yes _____No

If there is a conflict, please state the reasons for the conflict:

_____

_____

9. Local aquaculture products:

- Shrimp farming area (ha): _____ accounts for %_____ Output (tons / year) _____

- Fish farming area (ha): _____ accounts for %_____ Output (tons / year) _____

- Crab farming area (ha): _____ accounts for %_____ Output (tons / year) _____

- Seaweed farming area (ha): _____ accounts for %_____ Output (tons / year) _____

- Other species farming area (ha): _____ accounts for %_____ Output (tons / year) _____

(What kind of aquaculture species? _____)

10. Which aquaculture products are best suited to local development conditions (in the economic, social and environmental fields)? _____

_____

Appendix 3 - Interview questionnaire

I. Interview introduction

Hello. I am Le Thi Ngoc Thuy and I am participating in the master course in University of Tampere. During my implementation of my thesis, I am undertaking a study on the sustainable development in fisheries sector of Vietnam, with the aims of finding solutions to enhance fisheries activities, promoting the sustainable development in each performance of national, regional, local levels and contributing to building a more sustainable and responsible development. I would like send my warmest thanks to all participants for agreeing to be in this research. Shortly, I will ask you a series of questions about the Vietnam fisheries development and its sustainability in your experience, but first I would like to ask you a few questions about yourself.

Organization: _____

Date: _____

Interviewee Information:

Name: _____

Sex: _____Male _____Female

Position: _____

Number of year in this position: _____

II. Interview questionnaire (used to ask leaders, managers and specialists of fisheries sector)

General questions

1. Do you think that sustainable development is necessary for fisheries sector?
2. Which fields in fisheries sector are focused on developing sustainably? What are exact activities of the fields?

3. How are the activities implemented towards sustainability?
4. What are the roles of state organizations and management offices in spreading propaganda to aim at promotion the sustainable fisheries development?
5. Who are groups of people need a spreading propaganda?
6. What are the principles of the propaganda?
7. Why must Fisheries Law 2017 be promulgated?
8. What are new regulations in the Law 2017?
9. Has Vietnamese seafood industry dealt effectively with trade barriers and technical barriers of importing countries?

Questions on Aquaculture

10. Has the aquatic seed production of Vietnam met the requirements of quantity and quality?
11. Does aquaculture waste treatment meet environmental requirements?
12. How to boost aquaculture productivity?
13. Has the application of scientific and technological progress done well?

Questions on Capture fisheries and Aquatic resources conservation

14. What is your evaluation of offshore fishing activities?
15. How Vietnam can stop the over-exploitation?
16. What are activities protecting aquatic resources? Are they done effectively?
17. Could you talk clearly about co-management, please?
18. How many MPAs are there in Vietnam?

Thank you for your support!

Appendix 4 - Nine recommendations of EC

Nine recommendations of EC that Vietnam needs to correct to be withdrawn “yellow card” by the EU, including:

(1) Revise the legal framework to ensure compliance with international and regional rules applicable to the conservation and management of fisheries resources.

(2) Ensure the implementation and enforcement of the revised national legislation effectively.

(3) Enhance the effective implementation of international rules and management measures through a full sanctioning regime with enforcing and monitoring system.

(4) Address deficiencies identified in the Monitoring, Control and Surveillance (MCS) related to the requirements of international and regional regulations as well as within the framework of the fishing certification system.

(5) Strengthen the management and improvement of the registration and licensing system for fishing.

(6) Balance fishing capacity and fishing fleet policy.

(7) Enhance traceability of fishery products and take all necessary steps, in accordance with international law, to prevent illegal fishery products from being traded and imported into the Vietnamese territory.

(8) Strengthen and improve cooperation with other countries (especially coastal states in the waters where Vietnamese flag vessels can operate) in accordance with their international obligations.

(9) Ensure compliance with obligations on reporting and recording in Regional Fisheries Management Organizations (RFMOs).